

MOTOR AGE

Power Car Holds Court In Coliseum

Opening of Commercial Motor Wagon Show In Chicago Demonstrates That West Is Ripe For This Most Modern Method of Transportation—
Business Begins the First Afternoon and Promises to Hold Good Throughout the Entire Week



CHICAGO, Feb. 6—

The National Association of Automobile Manufacturers has every reason to believe that the commercial car show which opened at 10 o'clock this morning in the Coli-

seum will be fully as successful as the big affair in Madison Square garden in New York last month, not only from the standpoint of attendance but also in the volume of business done. If it isn't, it will not be because a systematic canvass of the entire country has not been made by the management, for not a stone has been left unturned to interest representative business men in the commercial power wagon and to secure their attendance at the show some time during the week.

Getting the Crowds

For the last 2 months this canvass has been going on, during which time 25,000 letters were sent out by the management, which has received more than 5,500 favorable letters, the writers of which have given assurances that they are interested in the proposition and that they will attend the show. In sending out these letters Bradstreet's and Dun's were consulted and every business man with a rating of \$50,000 or more was written to and told of the great show that was to be held. In the letter zone were western New York,



Chicago Show Success

Chicago has the most representative commercial car show that ever has been staged in this country. There are fifty-seven different makes of trucks and light delivery cars on view, making a total of 161 machines in all. The majority are of the light delivery type with a sprinkling of taxicabs, firefighting apparatus and ambulances. If it were possible to make a composite power vehicle of the 161 machines one would have a huge truck of 317 tons' capacity and with a motor of 4,387 horsepower.

Before the first half of the show was over those exhibitors who also had been at New York unhesitatingly declared that they are getting more business at Chicago than in Madison Square garden; that the attendance is better and that the general layout of the show is superior to that of the A. L. A. M.

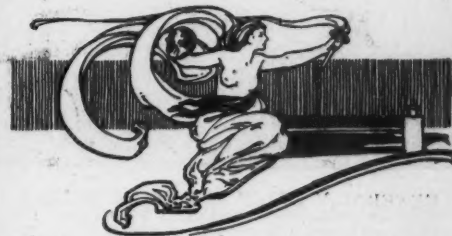


Pennsylvania, Minnesota, North Dakota, Montana, Colorado, Oklahoma, Tennessee, Missouri, Wyoming, Washington and other points on the Pacific coast. The only exceptions

were the New England and Atlantic states, which were passed up, because it was figured that because of the exhibition of motor trucks that were made at New York and which will be made in Boston next month would be sufficiently close to home to make it unnecessary for the business men in those section to travel to Chicago to inspect trucks.

Interesting the Business Men

The letter scheme was an exhaustive one and started more than 2 months ago. In the first letter sent the scope of the show was entered into and the business men told of the great variety of power wagons that were to be shown. Each business man was asked frankly if he was interested, and even if he wasn't to reply and let the management know. Those who paid no attention to the first letter were sent a second one and when even that failed to evoke an answer a third one was sent. Of course, many of the 25,000 canvassed replied that either they could not find the time to come or were not ready to consider the proposition at the present time, but



after the canvass had been reviewed it was discovered that more than 5,500 had agreed to come on for the show.

Not only were the business men themselves invited to attend, but the management went even farther by interesting officials of other cities and towns who might be in the market for commercial wagons. Particular attention was paid to fire departments and the fire chiefs were told of the fine display of fire-fighting motor apparatus that was to be made here. As a result of this the management has on its list the names of 150 city officials who have accepted the invitation to be among those present. In most instances mayors of towns have promised to come and among the places that will be represented at the show by city officials are those from Elgin, Aurora, Freeport, Joliet, Peoria, Rockford, Springfield, Streator and Waukegan in Illinois; Kokomo, Michigan City and South Bend in Indiana; Cedar Rapids, Davenport, Fort Dodge, and Waterloo in Iowa; Benton Harbor, Manistee, and Muskegon in Michigan; Springfield, Ohio, and Racine, Wis. The entire board of public service is coming from Indianapolis; Memphis will send a delegation, and so will Council Bluffs, Ia.; Sioux Falls, N. Dak.; Paducah, Ky., and Leavenworth, Kans. Postmasters are expected from Milwaukee, LaCrosse, Wis.; Duluth, Minn.; Sheboygan, Wis.;

Racine, Wis.; Aurora, Ill.; Joliet, Ill.; Logansport, Ind., and Cedar Rapids, Ia.

The show opened this morning 12 hours ahead of the time originally scheduled, demonstrating how well organized are the show forces. The management figured out that by opening this early they could hold over many of those from the pleasure car week who might like to take a peep at the commercial show before returning home and who possibly would not have done so had they been forced to wait until tonight. The wisdom of this move was fully exemplified by the attendance this morning and this afternoon, when the show building was comfortably filled not only by agents but by representative merchants.

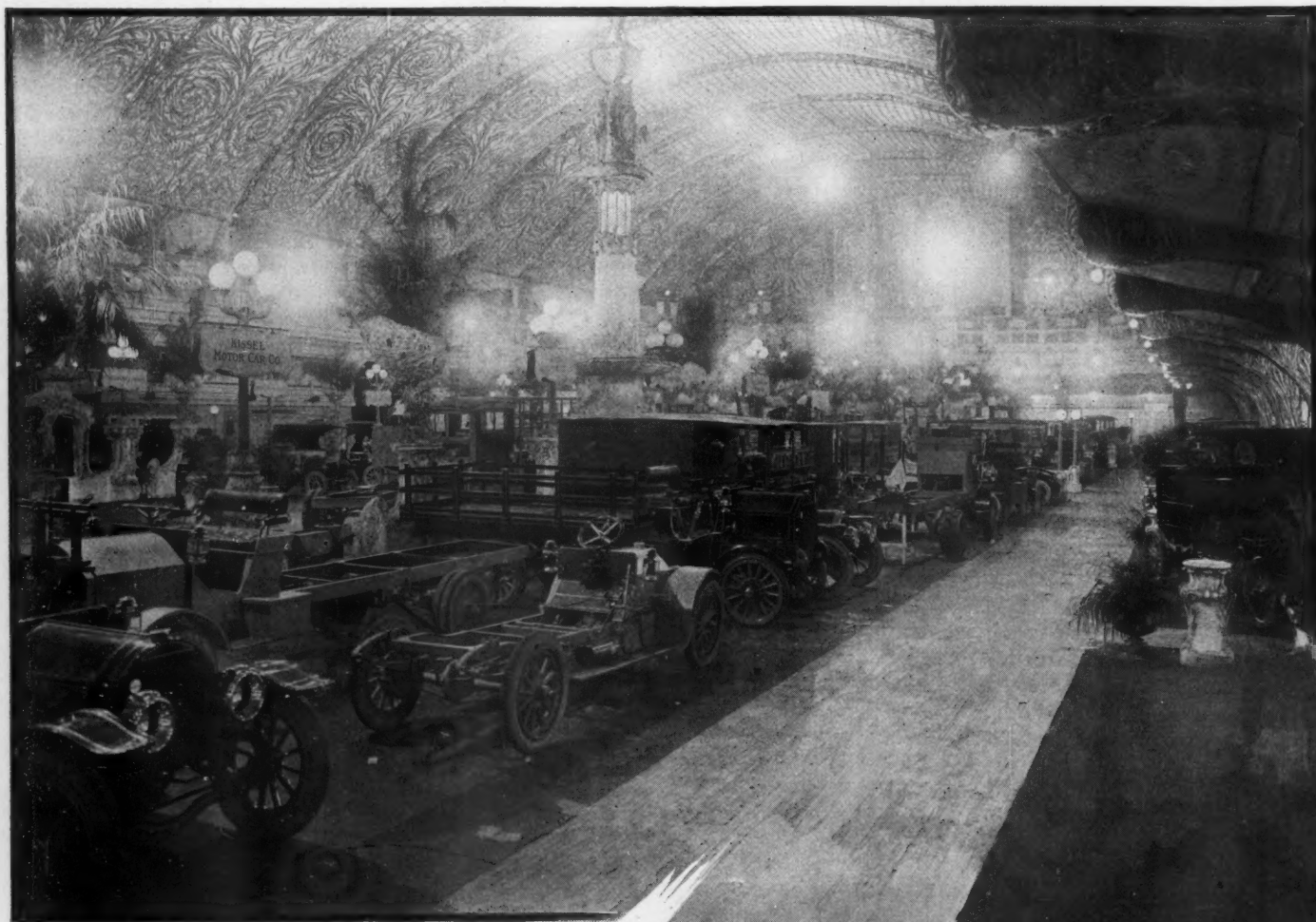
Census of the Show

The exhibit opened with fifty-seven concerns displaying power wagons, 150 companies handling accessories and nineteen motor cycle builders. There has not been any falling off in the accessories ranks, for while thirty withdrew from the annex and one from the Coliseum Saturday night, their places were immediately taken by others which make a specialty of commercial sundries. The commercial forces took possession of the building yesterday and moved in without a hitch. The doors of the annex were opened at 9 o'clock yesterday morning, at which time Wabash avenue was jammed with big trucks and

light delivery wagons. Quickly but without confusion the cars started to go in and at noon time the street had been cleared and by 2 o'clock all but two or three of the exhibits had been placed, while the stragglers all were in before 6 o'clock. So well carried out were the plans that had the management desired to open the show yesterday afternoon it would have been possible to have done so.

Layout of the Show

The commercial show is confined entirely to the Coliseum and its annex, the armory having been given up. As the show is laid out all the commercial cars with the exception of three concerns which went into the annex from choice, are located on the main floor of the Coliseum. The accessories people, who were in the gallery in the Coliseum, have stayed there, while more of them is found on the second floor of the annex. The first floor of the annex has been given over to the motor cycle display. The show decorations are the same that were used last week, but the spaces have been changed about considerably in order to accommodate the big machines that are on view. In the main the spaces are larger than last week, and the spreading out of the show has, if anything, added to its beauty. Only one of those concerns which were in last week has stuck to its original camping place,



GENERAL VIEW OF THE COMMERCIAL EXHIBIT FROM THE SOUTHEAST CORNER, SHOWING THE KISSEL EXHIBIT IN THE FOREGROUND, WITH KNOX, FRANKLIN AND RAPID JUST BEYOND

that being the Packard, which is at the north end of the main aisle. However, the Packard people have been obliged to overflow into the old Stearns space to the south in order to properly display its seven commercial wagons.

While the gasoline car is in the big majority there is a good representation of electrics, including the Studebaker, Waverley, Baker, General Vehiele, Lansden, Automobile Maintenance and Detroit. There are four fire-fighting machines on view, including the Knox, Packard, Rambler and Kisselkar. The Knox comes into the show after a public demonstration of its efficiency Saturday afternoon, when the Knox company invited local firemen to watch the operation of the big machine at the Madison street bridge. The demonstration was hampered somewhat by the stiff wind that blew, but notwithstanding this the Knox engine threw a stream across the river, much to the astonishment of the firemen, who had not looked for such powerful demonstrations.

Blizzard Strikes Chicago

To a certain extent the opening of the show today was marred by the weather conditions that prevailed outside, although this apparently did not keep many people away from the show. The big building was well filled in the morning, while in the afternoon the aisles were somewhat con-

gested. Outside Chicago was covered by a blanket of snow, the result of a blizzard which blew up last night and which tied up traffic throughout this section. Those hit hardest by this change in the weather were the members of the Motor Truck Association of Chicago, who had made arrangements for a parade through the loop district in order to attract the attention of the business men to the commercial show. They had been promised more than 150 machines belonging to business houses in the city, but the change in the weather kept many away, the result being that when the parade lined up this noon in front of the Coliseum there were only some thirty vehicles in line.

Parade Held Monday

It has been feared that because of the congestion of the loop districts that the police might refuse to permit the parade to go into that section of the city, but the truck association had enough influence with the powers that be to get the permit, the only stipulation being that the route be slightly changed in order not to go where the traffic was heaviest. Among the wagons that turned out for the demonstration were the following makes: Walker, Lansden, General Vehiele, Couple-Gear, Randolph, Chicago Motor, Rapid, White, Ideal, Grabowsky, Frayer-Miller, Champion, Chautauqua and Reliance. Of

these eight were large trucks and brought up the tail-end of the procession.

Considering the weather conditions the parade was a good one, and the demonstration in the loop district must have been an eye-opener, for business men who are accustomed to seeing horse-drawn vehicles put in the stable when the snow falls as heavy as it did last night. The turnout of these machines, most of which were cars owned by local business houses, brought together many veterans. One of these was a Couple-Gear truck which has been in the service of the Hammond Packing Co., a concern at the stock yards, for the last 5 years, in which time it has ground out an average of 20 miles a day with very little trouble and which looks as sturdy today as many of the newer ones. There was a Randolph light delivery wagon which has been running for the George W. Jackson Co., a contracting firm, since 1908 and which does its 50 to 75 miles a day. Henry Bauer, plaster contractor, had a Randolph truck which has been running for 1½ years and which has been in the shop only once in that time, that being to fix a muffler. This wagon hauls scaffolding and boxes, the loads ranging in weight from 500 pounds to 1 ton. A 3-ton Frayer-Miller, operated by Libby, McNeil & Libby, the packers, has been in service 6 months, running 12 hours a day and



GENERAL VIEW FROM THE ENTRANCE SHOWING COMMERCIAL CARS IN THE COLISEUM, WITH THE REO AND OVERLAND JUST APPEARING IN THE RIGHT FOREGROUND, AND THE PEERLESS, ALCO AND HEWITT ACROSS THE AISLE. AT THE END OF THE AISLE IS SEEN THE LANSDEN



COMMERCIAL CARS IN THE COLISEUM

CENTRAL AISLE IN THE COLISEUM SHOWING THE STUDEBAKER EXHIBIT IN THE FOREGROUND WITH THE WHITE EXHIBIT TO THE RIGHT. IN THE CENTER OF THE FOREGROUND IS THE STUDEBAKER-GARFORD PUBLIC SAFETY WAGON, OR PATROL VAN

averaging about 40 miles a day in the hardest kind of service. The driver says that he never was laid up an hour since he got the car, and that he uses not more than 7 or 8 gallons of gasoline and 2 quarts of oil a day.

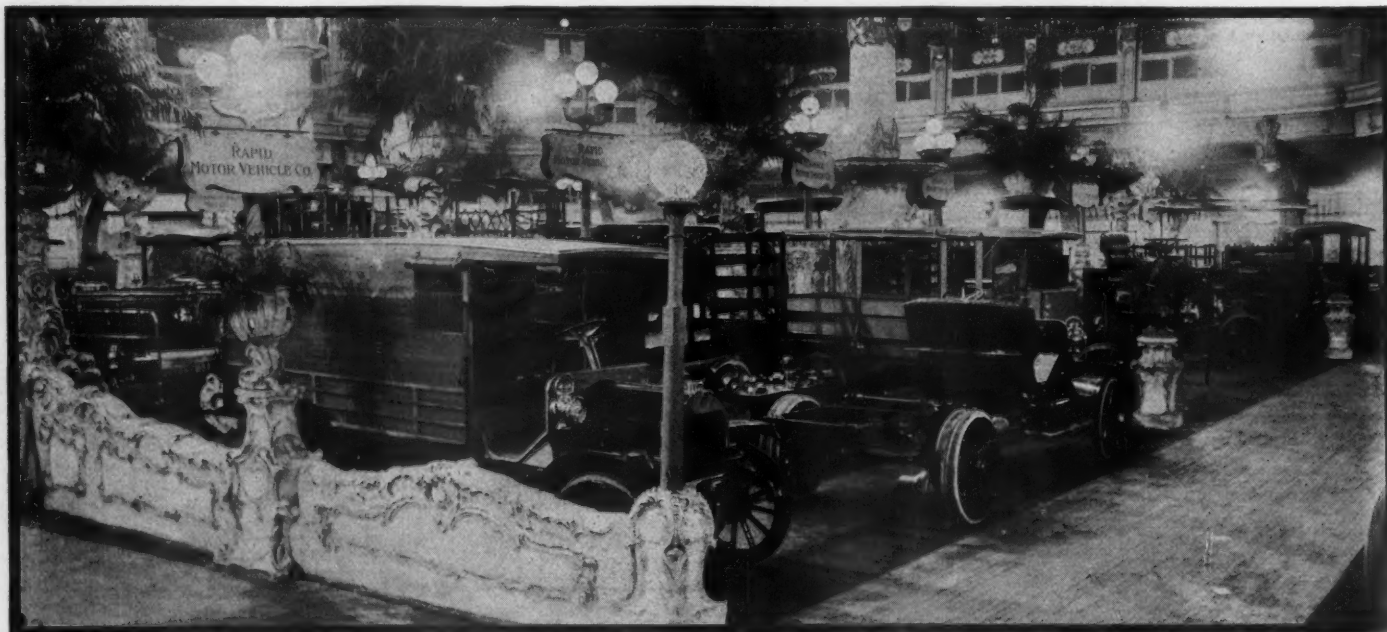
Some Big Mileages

Another Frayer-Miller belongs to the Wadsworth-Holland Co., a paint-making concern in this city, whose driver reported a mileage of 11,492 miles in the 13 months he has had the machine, in which time he has been working 10 hours a day. A General Vehicle 3½-ton electric truck which is used by Sulzberger & Schwarzschild, the packers, gets a maximum service by having

two batteries. While the machine is out on its morning round, the extra battery is being charged, while at noon the driver makes the change and leaves the partly discharged battery in the barn for recharging while he goes well equipped for the afternoon service. Because of the double battery he is in a position to get 70 miles a day out of his car, although his work does not call for that much, the daily distance being about 35 to 40 miles on the city streets.

Another veteran in the parade was the Rapid 1-ton truck which climbed Pike's peak and which has been in the Glidden tour. This truck has run 25,000 miles, it

is claimed, since being first put out. While the parade was in progress today the show building was filling up with interested spectators and by 2 o'clock there wasn't a stand in the building but what had its little crowd. This unexpected turnout caught most of the exhibitors by surprise and it soon became apparent that most of them did not have enough salesmen on the stands to take care of the people. It was no uncommon sight to see ten or twelve spectators in a booth and with only one salesman to hand out the information. The lesson thus taught, though, undoubtedly will result in more salesmen being placed upon the floor. Even this



COMMERCIAL CARS IN THE COLISEUM

NORTH HALF OF EAST AISLE SHOWING RAPID AND RELIANCE PLACES, WITH THE RAPID CHASSIS IN THE IMMEDIATE FOREGROUND. AT THE LEFT OF THE ILLUSTRATION IS SHOWN AN ATTRACTIVE TYPE OF COVERED DELIVERY WAGON WITH WINDOWS AT THE END OF THE SEAT AND DROP CURTAINS TO COVER THESE



COMMERCIAL CARS IN THE COLISEUM

AN EXHIBIT OF KNOX TRUCKS. THE EXHIBIT INCLUDES A 5-TON CHASSIS, BACK OF WHICH IS SEEN THE 60-HORSEPOWER FIRE PUMP, WHICH MADE A DEMONSTRATION FOR THE CITY OF CHICAGO AND VISITING FIRE CHIEFS DURING THE SHOW

early in the week it is apparent that the Chicago show is going to be better than the one held in Madison Square garden, New York. The attendance today was better than the opening day in New York, while the business prospects it developed were far more numerous. Then, too, say the tradesmen who have been to both shows, the decorations in the Coliseum give a better effect than did those of New York. The stands are spacious and the on-lookers get a comprehensive view of the entire show from the galleries.

Chicago also has far more cars on view than did New York. Here there are fifty-seven varieties, while in New York there

only were thirty-two. New York had 109 cars on view, including electric pleasure rigs, while in Chicago there were 161 machines in all. A trip around the building, however, shows the western trend in that New York had more heavy trucks than has Chicago, this city evidently being stronger on the light delivery proposition than those in the east. New York had fifty-five heavy trucks, by which classification is meant those machines of a capacity of 3 tons and up, while here in Chicago there are thirty-three heavy trucks and fourteen heavy truck chassis, leaving 114 machines in what might be termed the light delivery class.

There are some giants in Chicago's heavy artillery, including the 10-ton Hewitt and the 10-ton Couple-Gear tractor. The Couple-Gear was not shown at New York, but the big fellow on view here is so designed that it can be used either for a tractor or for an ordinary truck. When used as a tractor it has power enough, it is claimed, to haul a freight train, it being asserted that one customer uses his truck for that purpose. The Macks have one 7-ton truck and a couple of 5-ton, while the big one in the Reliance line is of 6-ton capacity.

The Saurer, the only foreigner in the show, is exhibiting a 4½-ton truck and a



COMMERCIAL CARS IN THE COLISEUM

CENTER AISLE OF THE COLISEUM SHOWING THE GENERAL VEHICLE EXHIBIT TO THE RIGHT, AND PACKARD EXHIBIT TO THE LEFT. THE PACKARD EXHIBIT INCLUDES CHEMICAL WAGON, ICE WAGON, AND DIFFERENT STYLES OF TRUCKS AND EXPRESS WAGONS, WHILE THE GENERAL VEHICLE SHOWS ELECTRIC TRUCKS BUILT FOR CHICAGO USE



COMMERCIAL CARS IN THE COLISEUM

ALONG THE LEFT AISLE OF THE COLISEUM IS A BIG LINE UP OF DIFFERENT SIZES OF SAMPSON TRUCKS. AT THE EXTREME RIGHT IS A BRUSH DELIVERY WAGON, WHICH IS PART OF THE UNITED MOTORS FAMILY AT THE SHOW

6-ton chassis. In addition to these there are other heavy trucks shown by the Alco, Baker electric, Avery, Kissel, Peerless, Garford, Grabowsky, White, Packard, General Vehicle, Sampson, Morgan, Kelley, Brodessa and Harder. Altogether these big fellows make a showing that is appreciated by every one.

As the management is making a big play to attract city officials, it finds itself in a position to make good on the promises held out to the mayors, fire chiefs and others in that it has a strong line of machines designed for municipal use. New York only had three types of fire fighting apparatus on view, including the Knox, Auto-car and Pope-Hartford, whereas Chicago has four of this distinct type, three of which were not shown in New York

Horsepower and Carrying Capacity

As the show field is divided up, the total display takes in 129 cars of all kinds and thirty-one chassis. An interesting lot of statistics is secured by going into detail as to the total carrying capacity of these 161 machines. Taking them at their catalog rating, one finds that if it were possible to build one huge truck that this giant machine would be capable of carrying 633,900 pounds, or roughly, 317 tons. These statistics also give a line on the tendency as exhibited at Chicago in that they give the average carrying capacity of the 161 machines as about 2 tons, which is borne out by the comparative scarcity of the heavier trucks in the show as referred to above.

In keeping with the trend in carrying capacity is the average horsepower of the Chicago cars, the figures showing that the average of the lot is 30 horsepower, the total horsepower of the 161 amounting to 4,887. One can well imagine what a powerful machine would be the result if a composite car could be built with a rating of 4,877 horsepower and a carrying capacity of 317 tons.

Education of the Driver a Matter of

It easily is apparent at the show that the main consideration with the prospective purchasers of trucks is the driver, for the business man as a rule recognizes that the pilot probably is 75 per cent of the success of the new system of transportation. Without a good driver, a conscientious man who is making this a profession, the concern employing motor trucks is greatly handicapped from the very start. Therefore, one of the first subjects gone into when the negotiations for the purchase of

a truck are started is the taking up of the question as to how to secure the right kind of men for this work.

Two Kinds of Drivers

As the field divides itself up to the present time there are two types of drivers that are to be had. One of these is the professional chauffeur who has driven pleasure cars and who has switched to the truck class, while the other is the old and trusted employe who has been driving horse-drawn vehicles for the concern for



TESTING KNOX FIRE TRUCK

ON SATURDAY OF LAST WEEK A TEST OF THE KNOX FIRE ENGINE WAS MADE ON A DOCK ALONGSIDE THE CHICAGO RIVER, AND AT WHICH PERFORMANCE THE FIRE DEPARTMENTS OF CHICAGO AND MANY WESTERN CITIES WERE REPRESENTED. THE ILLUSTRATION SHOWS THE TRUCK ON THE DOCK READY TO START ITS TEST. THE WATER WAS PUMPED DIRECT FROM THE RIVER



COMMERCIAL CARS IN THE COLISEUM

IN THE FOREGROUND ARE SHOWN THE LIGHT TRUCK AND DELIVERY WAGONS OF THE OVERLAND AT THE LEFT, AND THE REO AT THE RIGHT. IN THE BACKGROUND IS THE MAIN ENTRANCE TO THE COLISEUM

Great Importance to the Merchant

years and who has kept abreast of the times by deserting the horse for the motor. Of the two the business man generally prefers the latter for various reasons. In the first place the professional chauffeur has been trained in a poor school for the commercial line, it is contended. He has had a comparatively easy time of it driving a pleasure car—not much work to do, easy hours and not much attention paid to how much is spent in the maintenance of the car. He has become speed-mad to a

certain extent and seldom recognizes that with a truck speed is far from being the main consideration; in fact speed should not enter into the commercial proposition at all.

Types of Drivers

On the other hand the graduate from the horse-drawn vehicle class usually is a man who has been in the employ of the house for 10 or 12 years, who knows the ways of that concern, knows the city like a book, knows the ins and outs of the

shipping yards and is not imbued with the idea that there is a fortune to be made in driving. He is content to make a good living out of handling a truck and economy of operation has been so forcibly impressed upon him with the horses that he is ever watchful of his employer's interests when at the wheel of the truck. Granted that he may not possess the mechanical knowledge of the professional chauffeur to start with, it no longer is so important as it was in the earlier days of motoring. Efforts on the part of the designers to make the trucks fool-proof are bearing fruit and generally big business houses in their garages maintain a force of mechanics whose duty it is to attend to the mishaps, leaving to the driver the task of piloting the big machine.

Makers Perfect a System

Business men who are at the show and inquiring as to how best to handle the driver problem find that the manufacturers of motor trucks have given this matter serious consideration and are in a position to advise their clients. The R. L. Morgan Co. is one of the concerns which has gone into the matter most exhaustively and in anticipation of such requests for information from its customers it has drafted out a system, the foundations for which were laid in 1903 by C. H. Martin, now of the Morgan company, who put it into execution in Porto Rico where 8 years ago he operated a motor bus line which consisted of three two-cylinder Knox cars which carried not only passengers but the government mail as well.

The system started with the applicants for drivers' jobs filling out a blank which called for answers to seventy-two questions which were so framed as to bring out clearly just what the applicant knew about motor cars. After the jobs had been filled there were more blanks to fill out, each driver being required to file a daily report following an inspection of the car at the



TESTING KNOX FIRE TRUCK

DURING THE TEST OF THE KNOX FIRE TRUCK BEFORE THE DIFFERENT FIRE DEPARTMENTS, THE 60-HORSEPOWER MOTOR PUMPED A MAXIMUM OF 730 GALLONS A MINUTE. THE TEST LASTED FOR UPWARDS OF 2 HOURS. THIS APPARATUS HAS BEEN WORKED CONTINUOUSLY FOR OVER 5 HOURS IN ONE OF THE EASTERN CITIES FOR TEST PURPOSES AND ALWAYS HAS MADE GOOD

conclusion of the day's work. This he made out in duplicate, one of which was left in the car and the other filed at the office. Following the driver came an inspector who also had to add his little bit to the report to the sheet, noting just what had to be done to put the machine into mechanical condition. So well did the scheme work out that when Mr. Martin connected himself with the Morgan company his Porto Rican ideas were adopted and now form a part of the Morgan system. As the scheme works the first step is the filling out of the application for the position, the blank reading as follows:

- 1—What trucks have you operated?
- 2—How long?
- 3—Where?
- 4—For whom?
- 5—What is carbon?
- 6—Where will deposit of it be found and how detected?
- 7—How is it to be removed?
- 8—What may cause an engine to back-fire through the carbureter?
- 9—What may cause an engine to skip explosions?
- 10—How should push rods be adjusted?
- 11—How should valves be ground, i. e., what is the operation in getting a perfect seat?
- 12—What is meant by advance and retard spark?
- 13—What does black smoke issuing from the muffler mean?
- 14—What does white smoke issuing from the muffler mean?
- 15—What causes the engine to heat?
- 16—What will short-circuiting of ignition do?
- 17—How would you tighten the clutches, low speed and reverse?
- 18—How would you tighten the high-speed clutch?
- 19—How would you tighten the foot-brake?
- 20—In case of slack drive chain, what would you do?
- 21—What causes slack of chain?
- 22—How do you tell when engine is running on three or fewer cylinders?
- 23—Suppose you break a chain and decide to go home on one chain, what would you do?
- 24—How would you adjust the radius rods?
- 25—What kind of anti-freezing solution do you prefer?
- 26—How do you mix it?
- 27—How often should it be put in car?
- 28—Where would you put it—engine or transmission?
- 29—How often should countershaft be lubricated?
- 30—Should it be lubricated with grease or oil?
- 31—How often should wheel bearings be lubricated?
- 32—With grease or oil?
- 33—How often do you fill engine reservoir with oil?
- 34—How do you know when it is filled?
- 35—Name oil holes and grease cups on engine.
- 36—Name vital oil holes and grease cups on transmission and countershaft.
- 37—How often should they have attention?
- 38—What cylinder oil do you recommend, i. e., as regards fire-test and viscosity?
- 39—How often should you fill radiator?
- 40—How often should you lubricate steering knuckle pin and with what?
- 41—In case you have to stop car in emergency, what would you do?
- 42—Do ball bearings need any oil?
- 43—When cranking car to start would you advance or retard spark?
- 44—If engine does not start easily in the usual way, where would you look for the trouble?
- 45—In making extended stops would you leave engine running or stop it?
- 46—In coasting down grades would you pull control lever into first or second neutral?
- 47—If engine, while running, fails to stop when throwing off switch, what is wrong?
- 48—If you disengage high-speed clutch and car fails to respond, what is wrong?
- 49—What would you do in that event in the case of emergency stop?
- 50—What is the remedy?
- 51—Can you distinguish a piston-ring knock from a bearing knock?
- 52—A. How would you locate a knock in engine? B. What is the first thing you would do if you detected a knock in the engine? C. What will happen if not given immediate attention?
- 53—When should you race the engine?
- 54—How do you race the engine?
- 55—What happens when it is raced idle?
- 56—If you were out on the road and had a connecting rod bearing go bad, how would you get home without calling for assistance?

62—What is the maximum speed at which you would operate a 5-ton truck?

63—How would you adjust carbureter to get best results?

64—In driving on level road how would you carry your spark?

65—When engine is working at its maximum capacity and "pulled down" to the point of laboring how would you carry your spark?

66—How would you start a load from a standstill?

67—What happens when the road wheels are thrown out of line?

68—When running on magneto what would you do to correct missing which you know to be due to faulty ignition?

69—When driving on wet pavement how would you avoid skidding?

70—If car should start to skid what would you do?

71—What happens when you run with a low spark and open throttle?

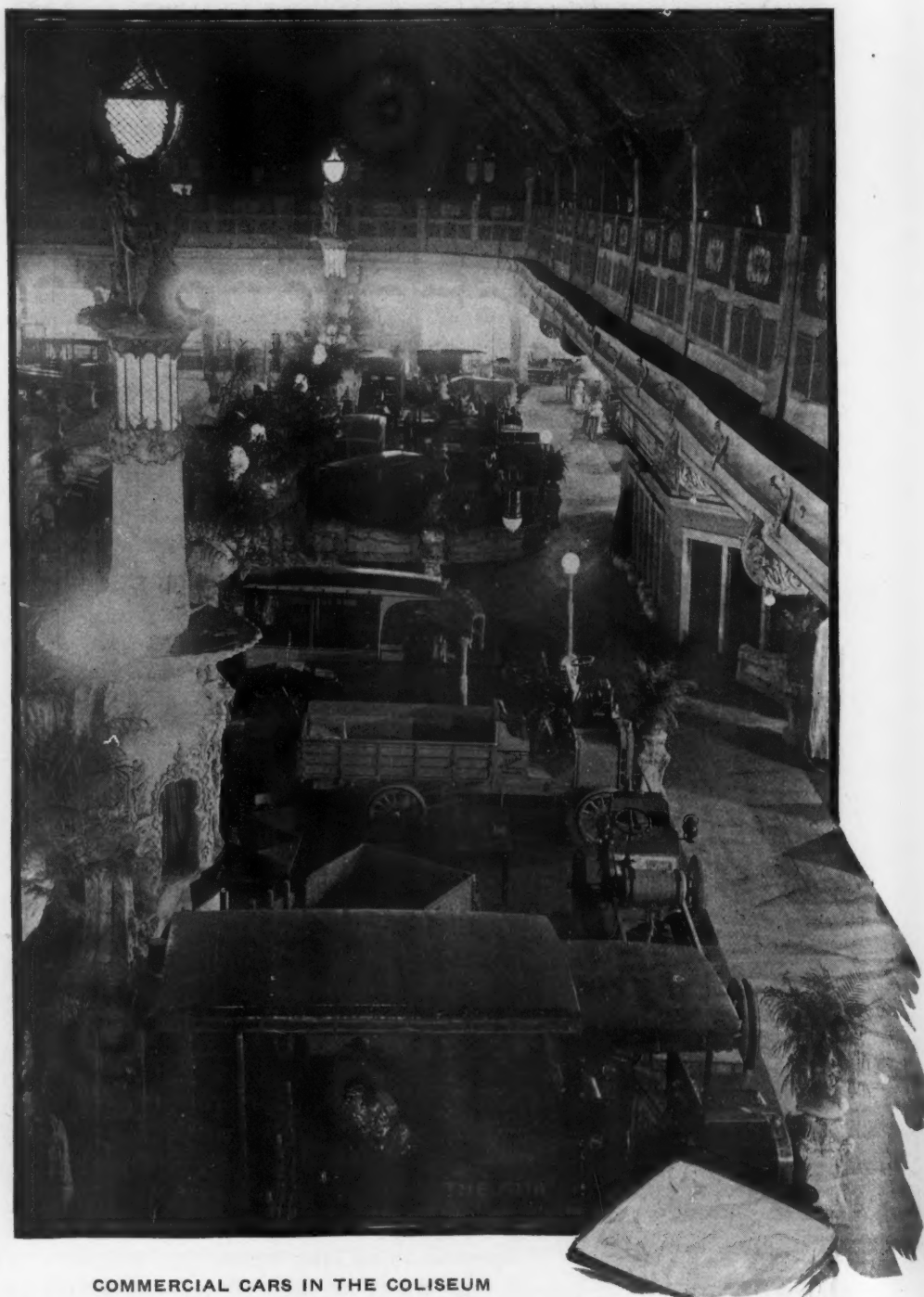
72—Describe how you would treat driving chains to insure long life?

The daily report blank for the inspectors and drivers also is interesting and possibly

may give ideas to business houses contemplating adopting the motor service. With this idea in mind Motor Age herewith reproduces the sample of this daily report.

The blank starts out with a paragraph to drivers and inspectors as follows: "The items given below are so chosen that the proper filling in of this report will constitute a thorough inspection of the entire car. Any unusual condition of the car or parts should be reported with the information as to cause, etc., by each driver at the conclusion of his run and he will give details of any repairs made on the road."

The motor is the first point taken up and the driver is instructed to: Clean oil pan and screen weekly; put in tablespoon of



COMMERCIAL CARS IN THE COLISEUM

LOOKING DOWN THE WEST SIDE OF THE COLISEUM, SHOWING THE COMMERCIAL IN PLACE. IN THE FOREGROUND IS THE MACK WIRE SIDE DELIVERY TRUCK WITH THE MAIS JUST BEYOND. BEYOND THE ENTRANCE AISLE ARE GROUPED SEVERAL TYPES OF SAMPSON TRUCKS WITH THE BRUSH DELIVERY BEYOND THEM

kerosene twice a week when motor is warm and let it stand over night; clean spark plugs; examine wiring and see that all connections are tight. Then the driver is required to answer the following: Conditions found, condition left, oil pan cleaned, oil screen cleaned, oil passages free, oil pump action, oil leaks, camshaft, bearings adjusted, piston pins inspected, valves, timing gears, noise, control, nuts and bolts, lubrication.

As to the condition of transmission and jackshaft the following are the points marked on the sheet for reply: Control, drive shaft, noisy, leaks, bearings, differ-

ential, sprockets, nuts and bolts, lubrication.

In the running gear department the driver is cautioned to be sure the distance rods are of equal length measuring from the center of the sprocket to the center of the wheels, and the following have to be answered: Front axle, bearing adjustment, rear axle, bearing adjustment, wheel fastenings, cotters; hub caps fit, set of front wheels, nuts all cottered, chains adjusted, distance rod, rivets loose, spring hangers, nuts and bolts, springs, lubrication.

Clutch questions asked are: Ease engagement, oil collars, leather universal

joints, springs, disks, collar, nuts and bolts.

Steering gear questions: Lost motion, adjustment, action, grease boots, connection adjustments, arms and cross rods, lubrication.

Brakes, transmission and rear wheels: Condition, adjustment, drums, control apparatus, brake action, lever action, nuts and bolts, lubrication.

Gasoline: Tanks leak, dirt in tanks, connections leak, connections clear, carbureter adjustment, carbureter action, control action, amount put in.

Under the head of cooling the driver is told to watch the radiator at all times, see that leaks are heeled and that it is kept filled with water. The radiator should be drained weekly and kept clean. The questions asked are as follows: Gaskets, couplings, glands, heating, fan, radiator, connections, tank leaks, pump action.

Ignition: Batteries date, bolts, amperes, wiring, coils adjusted, commutator, control action, spark plugs, magneto and lubrication.

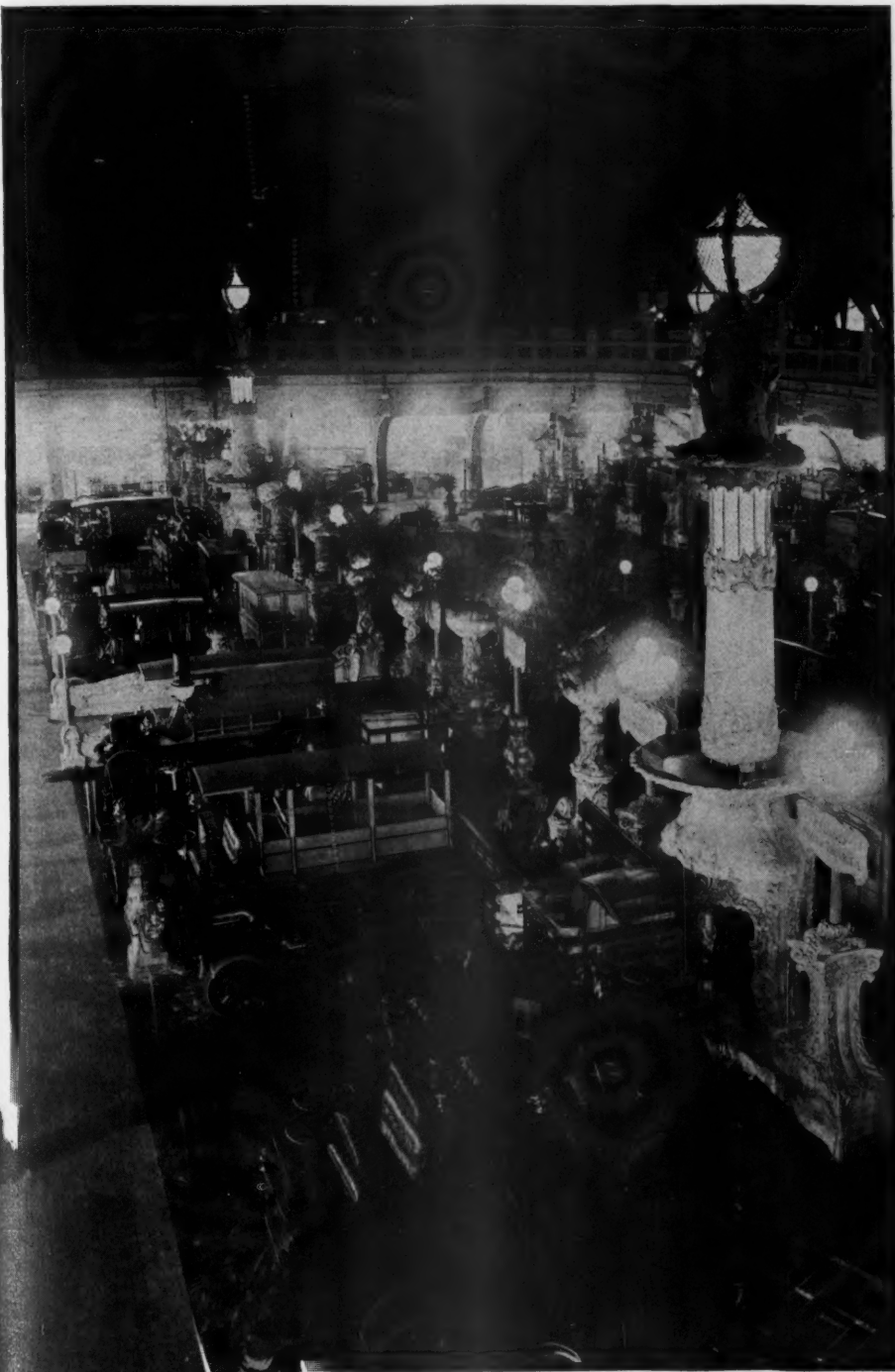
Mufflers: Noisy, leaks and clean.

In the lubrication section of the daily report valuable ideas are given as to where the oil and grease should be applied. Non-fluid oil should be used in the grease cups which are located on the oil drive of the engine, on the water pump, on the transmission main bearing, on the right countershaft and on the left countershaft. Non-fluid oil also should be used in the grease plugs, one being on the right steering knuckle, one on the left steering knuckles and one in the brass plug in the rear end of the transmission case, which should be oiled three times a week. All oil caps should be oiled weekly, and heavy grease should be put in the clutch collar daily.

Semi-fluid transmission grease or heavy oil should be put in semi-weekly in the two plugs on the top of the countershaft housing. The chains should be boiled in tallow and graphite once a week.


Places to be oiled daily with a squirt can are located as follows: Two on the starting crank bearing, four on the cab lever assembly, one on the foot brake bracket, two on the clutch cone and all fingers operating the high-speed clutch and all connecting links on the control shaft bearings, on the equalizer shaft bearings, on the radius rod cam bearings, on all steering connections, all spring ends, low-speed, reverse and service brakes, hanger pin, cam and roller on the control, control double end clevis connection, the extension shaft coupling, and emergency brake rod connection.

Vital places to oil with a squirt gun are: All oil holes in rocker arms and all push rod guides which should be oiled twice daily if the truck is used continuously; on the timer daily, while a drop of oil should be placed in the magneto every 300 miles, semi-weekly oil should be injected in the front end of the transmission and also in the rear; the steering gear should be oiled semi-weekly and the fan daily.



COMMERCIAL CARS IN THE COLISEUM

LOOKING SOUTH ALONG THE EAST AISLE OF THE COLISEUM. IN THE FOREGROUND CAN BE BARELY DISTINGUISHED THE LINE OF AVERY TRUCKS WITH THE RELIANCE AND RAPID BEYOND THEM. FURTHER ALONG THIS AISLE ARE THE FRANKLIN, KNOX AND KISSEL EXHIBITS



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Selling Commercial Cars

THERE is much need at the present time for strong salesmen in the commercial car field. The amateur who has sold pleasure cars for a year or so and looks upon himself as a gilt-edge product to dispose of commercial cars is proving a very weak member of the selling force, if the types seen at the recent commercial car show in New York and the present show in Chicago are typical examples, and which there is every reason to believe they are. Many of these salesmen are entirely ignorant of the commercial industry. They have been accustomed to selling pleasure cars on their ability to climb hills on direct drive or travel 60 miles an hour, and they think that commercial cars must be sold by the same arguments. When asked the speed of his 5-ton truck one salesman remarked, "It is geared for 12 miles an hour, but will run 25 with an overload." This is a typical example of many explanations that are being made every day on the matter of speed.

THAT company cannot exist which hopes to sell commercial cars with such arguments, nor can any company build a 5-ton truck which can make 25 miles an hour with its load. To the pleasure car man 25 miles an hour appears very slow, and he imagines that the truck can go at that speed anyway. But herein lies the danger. He fails to realize the enormous load that is being carried, because if the truck carries a 5-ton load in all probability it will weigh close to 5 tons, making a 10-ton load, where as it is rare that a touring car with load weighs 2 tons. This calls for five times the braking facilities, which is a big problem in any car.

BUT the salesmen are not only erring on the matter of speed but they are erring equally on the matter of load-carrying capacity. One salesman, when asked the weight of his truck, which was 4,200 pounds, was rather surprised when he realized for the first time that its regular load was but 2 tons or 4,000 pounds, and as soon as he saw these figures side by side he immediately remarked, "Although it is a 2-ton truck it is regularly intended to carry 3 tons and can carry 4 tons if necessary." It is poor business policy to build a 2-ton truck to carry a 2-ton load, and to sell it for a 2-ton truck, when it will carry 3 or 4 tons equally well. The salesman thought he was going to make a sale by his increasing the load carrying capacity of the truck. As a matter of fact he lost the sale. The buyer who was a shrewd business man immediately lost confidence in the salesman and also in the truck. He was sufficiently familiar with business enterprise to know that a 2-ton truck cannot carry 4 tons, and do its work properly.

DEALERS and branch houses who are selling commercial trucks must realize that they are in nearly every case dealing with business houses and with people who are buying trucks as an investment. These business men have in hundreds of cases been handling machinery of one nature or another in their industries for years. They know perfectly well that all machines will wear out, that machines cannot operate successfully with big overloads and that machines must be cared for, consequently the arguments that trucks will never wear out, will never require attention, and that they will care for overloads are useless, and in fact injurious, and the sooner this is appreciated by salesmen the better.

Farmers and Roads

THE old argument that the farmer is opposed to good roads has received a severe body blow during the past year. The farmer is no longer opposed to good roads, at least the progressive farmer is not. There was a time when he was opposed to them, when he was also opposed to the motor car, but today he is in favor of both. It has taken the farmer time to realize the advantages of the car to him. Heretofore he imagined that it was solely for the gratification of the pleasure of the wealthy citizen who occasionally wanted to go through the country for pleasure. On such occasions he succeeded fairly well in terrifying the majority of the farmers' horses and developing an excellent crop of rural antipathy towards the motor car. This feeling of antagonism continued for years, but as with all irresistible forces it was broken down, and now the farmer is really a friend of the motorist. There still remain those who are not and they will continue to exist for years; but, generally speaking, the farmer has realized the motor car is an asset.

FOR several years the farmer did not think he could afford a car, and as a matter of fact he could not, but the prosperity of the last 3 or 4 years has greatly changed the aspect of the situation, and today the farmer is in a much better financial condition than many of the city residents who own cars. The farmer is buying cars for two reasons: He is buying them for pleasure, and he is buying them for usefulness. He tries to combine both, and if he can't, then he selects whichever of the two appear the stronger. Some buy for pleasure purposes, some for business purposes. Where a car is bought for pleasure purposes it is a valuable adjunct to the community.

WHERE the motor car has been purchased for pleasure it has engendered a strong spirit of contentment in the farming communities. It has to a large extent solved the problem of "Keeping the boys on the farm." It has eliminated that drudgery which is so distasteful to youth; it has made it possible for the farmer to have time to perform his regular duties and also time to go to the city in the evening if he wishes to attend the theater, or participate in any form of recreation. With the horse-drawn vehicle this was an impossibility. Today the farmer with his motor car, the rural telephone, and his daily paper, made possible by the rural free delivery system, can be in as close contact with the life of the nation as the man in the city, and has the advantage of much more leisure time in which to read his paper and take real enjoyment from his car.

THOSE farmers who already own cars are big advertisements in the selling of other machines. Society works along the same lines in the country as in the city, and where one farmer has a car there is immediately bred in his fellow farmers a desire to own a better one. The very fact of farmers without cars seeing others pass and repass their homes in cars stirs up and creates the spirit to buy. The passing and repassing the farm home of the city car has stirred up the spirit of buying in the farmer, and although at one time the farmer did not welcome the sight of the city car along his highway today he does, and it helps to break up the quietness of country life. Because of this the farmer has learned to like the car, he has learned to use it, and where he has been an opponent to good roads he is now ready to help the cause.

Reorganization of the A. L. A. M. Begins

CHICAGO, Feb. 3—The reorganization of the Association of Licensed Automobile Manufacturers started at a meeting held yesterday in this city at the Blackstone hotel and which was presided over by Charles Clifton, president of the Selden organization, and which was attended by representatives of nearly all the prominent concerns in the licensed association. It is officially stated that this meeting is the first step taken by the makers to wind up the affairs of the A. L. A. M. and reorganize another association with a wider scope and broader aims.

Of course the session was open only to the manufacturers and the proceedings were of a secret nature, but it is generally understood that the trades people came to a pretty fair understanding as to what they intend to do in the future, and that the action which they will take will bring about a strong organization of motor interests. Officially the only news that came out of the meeting was to the effect that a special committee had been appointed to formulate the plans for the new organization contemplated. On this committee are C. C. Hanch of the Nordyke & Marmon Co., Hugh Chalmers of the Chalmers Motor Co., Charles Clifton of the Pierce-Arrow Motor Car Co., Benjamin Briscoe of the United States Motor Co., and Thomas Henderson of the Winton Motor Carriage Co. To this committee has been left the task of drafting the lines along which the new organization will follow.

Plans of New Body

The discussion at the meeting brought out roughly the ideas which the promoters have in mind. C. C. Hanch is one of those responsible for bringing about this new deal and it is said that Alfred Reeves will be asked to continue with the new organization instead of entering the general trade. Ostensibly the contemplated organization will promote shows and will be strongly organized with the idea of controlling the patent situation. The scheme is to organize a stock company, which at the present time is called the Motor Vehicle Co., with only 100 shares of stock, and those shares selling at \$100 each. Those concerns which are at the present time members of the A. L. A. M. can each purchase one share of stock, which, if they all take advantage of it, will not leave much for others. Companies not affiliated with the A. L. A. M. at the present time also will be eligible for membership. While Henry Ford was not present at the meeting it is generally understood that he is not at all averse to joining the new association and it is expected that he will be invited to join at the proper time.

The royalty scheme will not be abandoned altogether, it is said, but the royalty will not be paid upon the Selden patent,

Meeting in Chicago Results in Rough Formation of Motor Vehicle Co., Which Will Succeed Selden Organization

but upon other patents which the Motor Vehicle Co. will control. This royalty it is reported will amount to only one-tenth of 1 per cent of the list price of the cars, and most of this, it is thought, will go back to the members in the form of rebates.

Will Sell Stock

Selling 100 shares of stock at \$100 each will give the new association a fund of more than \$100,000 with which to start and will place it in a position where it can fig-

ure prominently in the patent situation. It is said that the patents which now are controlled by the A. L. A. M., and which include many valuable ideas, will be turned over to the Motor Vehicle Co., which will in turn secure other patents as they come out. Along these same lines it is said that one of the chief advantages of belonging to this association will be protection for the members in patent litigation. At the present time there are several persons who are claiming patents which are in general use in the motor field today and who are threatening suits against several concerns for alleged infringements of their ideas. In such instances the new association, it is claimed, will step to the firing line.

As for the A. L. A. M. itself, it is said that its affairs will be wound up as soon as possible, but this may be delayed somewhat, awaiting the settlement of the odds and ends in connection with the recent Selden suit. It is reported that at the present time the A. L. A. M. has a large sum in the treasury. The contract which the A. L. A. M. has with the Columbia Motor Car Co. and George B. Selden calls for an annual fee of \$150,000 from October to October each year, and this sum will have to be paid from the present funds. The costs in the Ford suit will require about \$15,000, so there will remain a substantial surplus for distribution among A. L. A. M. members.

Those at the Meeting

The different companies were represented at the meeting by their presidents or officers, as follows:

American Locomotive Co., James Joyce; American Motor Car Co., J. I. Handley; Apperson Brothers Auto Co., Elmer Apperson and George Strout; Autocar Co., John S. Clarke; Bartholomew Co., J. B. Bartholomew; Brush Runabout Co., Horace DeLisser; Buckeye Mfg. Co., G. A. Lambert; Buick Motor Co., C. W. Nash; Cadillac Motor Car Co., Ernest Benson; Chalmers Motor Co., Hugh Chalmers and C. C. Hildebrandt; Columbia Motor Car Co., H. W. Nuckles; Dayton Motor Car Co., Horace DeLisser; Everitt-Metzger-Flanders Co., George E. Keller; H. H. Franklin Mfg. Co., H. H. Franklin and C. H. Stilwell; Hudson Motor Car Co., R. D. Chapin; Jackson Automobile Co., G. A. Matthews and N. S. Potter; Locomobile Co. of America, A. W. Robinson; Lozier Motor Co., F. C. Chandler; Matheson Motor Co., G. W. Matheson and W. C. Shepherd; Maxwell-Briscoe Motor Co., Horace DeLisser; Metzger Motor Car Co., William E. Metzger; Mitchell-Lewis Motor Co., William Mitchell Lewis and James Gilson; Moline Automobile Co., William H. VanDervoort; Moon Motor Car Co., S. McDonald; National Motor Vehicle Co., A. C. Newby and George M. Dickson; Nordyke & Marmon Co., W. C. Marmon and C. C. Hanch; Packard Motor Car Co., S. D. Waldon, Alfred Macauley and M. J. Budlong; Peerless Motor Car Co., G. B. Sidel, Jr.; Pierce-Arrow Motor Car Co., Charles Clifton; Premier Motor Mfg. Co., H. O. Smith; Pullman Motor Car Co., T. C. O'Connor; Reo Motor Car Co., R. E. Olds and R. M. Owen; Alden Sampson Mfg. Co., Horace DeLisser; F. B. Stearns Co., Edwin McEwen; Stevens-Duryea Co., C. W. Richards and G. S. Delaney; Studebaker Automobile Co., George E. Keller; Waltham Mfg. Co., Windsor T. White; Willys-Overland Co., John N. Willys and George W. Bennett; Winton Motor Carriage Co., Thomas Henderson. General Manager Alfred Reeves and H. A. Bonnell were also present.

MONACO PUTS ON TEST

Paris, Jan. 26—To attract visitors to the shores of the Mediterranean, the authorities of Monaco recently undertook the organization of a motor rally. Starting from various points of Europe: London, Paris, Berlin, Brussels, Geneva, etc., at various dates, according to the distance to be covered, the competing cars had to reach Monaco as quickly as possible, in competition for the prizes awarded on a basis of speed, comfort, load capacity, etc. From Paris there were nine starters.

Henry Rougier made the fastest run with an inside-steering Turcat-Mery. Starting from Paris at 8 a. m., he pulled up at Monaco at noon on the following day, having covered the 570 miles in 28 hours 1 minute 7 seconds. De Aspigau, in a 40-horsepower Gobron with open torpedo body, carrying five passengers, made the trip in 28 hours 34 minutes 55 seconds. Henry Goldstuck's La Buire finished the run across France in 31 hours. A 20-horsepower Gobron occupied practically the same time, and a two-cylinder Lion-Peugeot, with two passengers and baggage, pulled up opposite occasion within 24 hours.

It appears likely that the first prize will fall to Henry Rougier, for, in addition to maintaining the fastest average speed, he will receive higher marks than the others by reason of the greater comfort of his completely closed car. Rougier's time is not a record, but nevertheless is fast going, in view of the fact that the competition was held in mid-winter over indifferent roads. In summer the run from Paris to Monaco has been made on more than one occasion within 24 hours. The average tourist to the Mediterranean occupies 3 days for the journey.

The German contingent, starting from Berlin, and having to cover 1,056 miles, did not keep up the same high average as the Frenchmen, the fastest time being made by Von Esmarch in a 35-horsepower Dürkopp, in 71 hours 44 minutes 10 seconds.

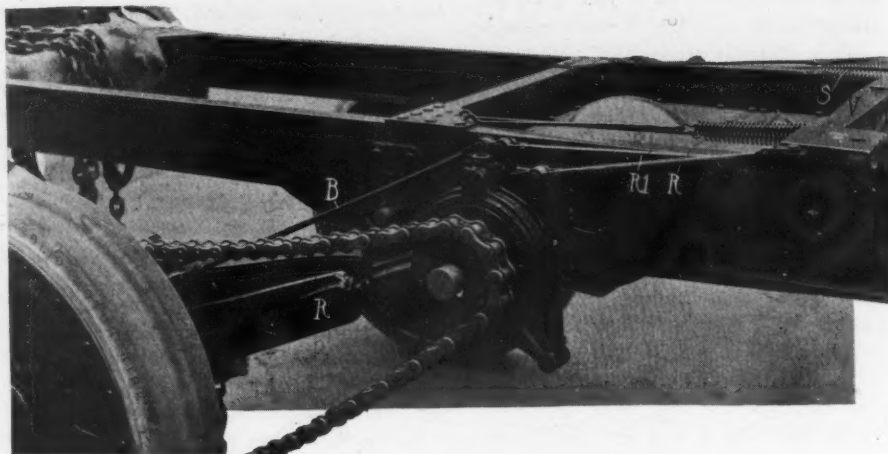
Protection of the Motor and Other Parts

SAVING the motor from vibration is one of the big problems with which many truck makers are working at the present time. This is true particularly with 7 or 10-ton trucks, in which the springs must be very heavy to carry these enormous loads. Using such heavy springs means that when the truck is empty the springs are so heavy that they scarcely afford any resilience whatever to the motor, so that it is only saved from the hammering by the resilience of the solid rubber tire.

Some manufacturers have aimed at reducing the vibration at the front end of the motor as much as possible by locating the motor, as in a pleasure car, namely, under a hood, and having the driver sit back of the motor, the same as in a touring car. In such trucks the load is practically balanced over the rear axle, and specially heavy tires used in order to carry it. By doing this the load on the front springs is practically restricted to the natural weight of the forward end of the truck, and this weight scarcely varies when the truck is loaded as compared with empty; consequently the front springs are designed to carry the motor load and to afford the desired resilience.

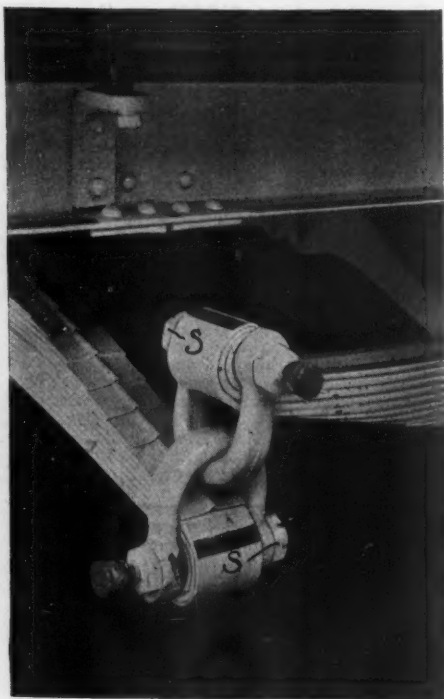
Where, however, the driver's seat is

Carrying the Motor On a Subframe with Additional Spring Support Being Used Quite Generally—On Heavy Trucks Double and Triple Spring Suspension Systems Are Used—Dual Tires Found on Rear Wheels of All Big Mo or Trucks



RELIANCE JACKSHAFT DESIGN

On the 5-ton Reliance truck the service brakes are located on brake shoes carried on the jackshaft between the sprockets and the frame members. These brake shoes are fabric-faced members which entirely surround the wheel. The brakes are applied by the rod connection R, through an equalizer V extending across the frame on top; this equalizer being much the same as used on pleasure cars. The rear wheel brakes are applied through rod connections R1, and thence through an equalizer V1, immediately beneath the equalizer employed for the jackshaft brake. Springs S are fitted to insure the immediate release of the brakes. On this truck the radius rods R, extending between the rear axle and the jackshaft, and used for transferring the power from the rear axle to the frame, are heavy, as in all trucks, and have adjustment features.



RAPID SPRING CONSTRUCTION

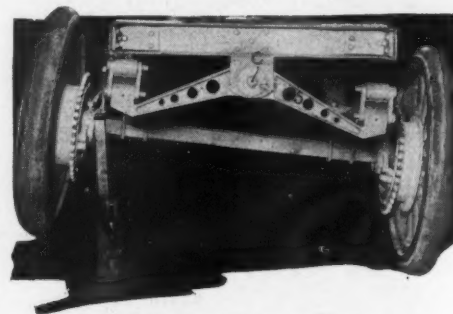
On the Rapid truck a platform rear spring is used and in order to get strength where the cross spring is shackled to the side spring, a novel scheme has been used. On each spring three of the main leaves are curved around the shackle bolt S, whereas in pleasure car work only one spring leaf is curved around. The object in the Rapid case is to increase the spring strength. The usual precaution of using grease cups for lubrication of the shackle bolt is followed.

mounted over the motor, then the load is carried more between the axles, and from 30 to 40 per cent of it is carried on the front axle. Under such circumstances much stiffer front springs must be used, and in proportion as these are stiffened the vibration to which the motor is subjected with the truck empty is increased. It is generally on trucks of this design that special arrangements are used.

One leading method of reducing motor vibration is that of carrying the motor on a subframe and supporting this subframe by springs on the main frame. Such a scheme is worked out on the Sampson, Brodesser, and Stearns trucks. On the Sampson and Brodesser the subframe members are hinged at their rear ends to a cross member of the frame, so that the forward end can swing up or down. At the front end, instead of a rigid support, there is a support between upper and lower coil springs, resembling the support of the front end of a torsion bar on a shaft-driven car. In the Brodesser the front end of each subframe member is carried in a stirrup which works in a vertical guide. This stirrup is carried on two stiff coil springs beneath it and two above it. As the motor runs with the truck idle, the gradual rise and fall of the front ends of the subframe members shows how these springs perform their work. In the

Sampson truck practically the same construction is used.

In the new Stearns four-cylinder truck, brought out within the last 6 months, the motor is carried, touring-car fashion, under a forward hood, and the driver sits back of it. Notwithstanding this arrangement,

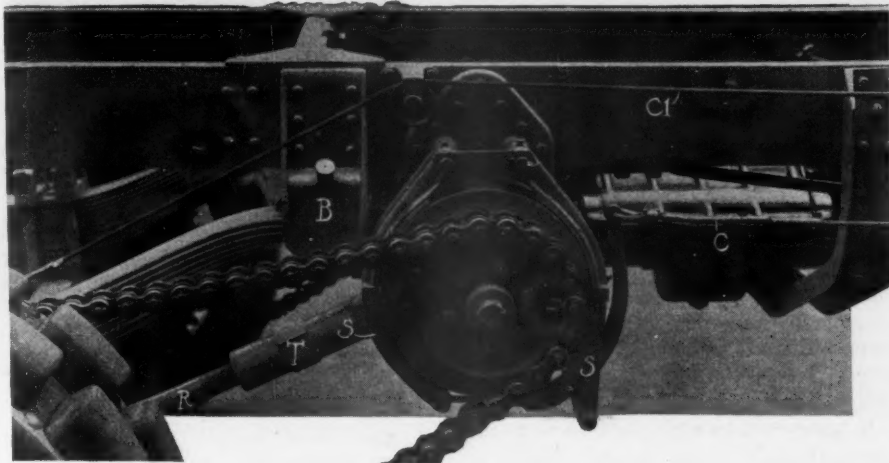


HARDER REAR SPRINGS

On the Harder truck of Chicago a novelty has been introduced for the rear springs in the form of a hinged support S, which is fulcrumed at its center C from the frame. The support S attaches to the side springs at its ends. The illustration shows the object of this support, namely, that of carrying the body of the truck level when one wheel is passing over an obstacle. This construction must not be confused with a platform spring design, as the cross support is not a spring in any sense of the word, but solely a means of freeing the frame from the upward pressure of the left spring when the left rear wheel is elevated as shown.

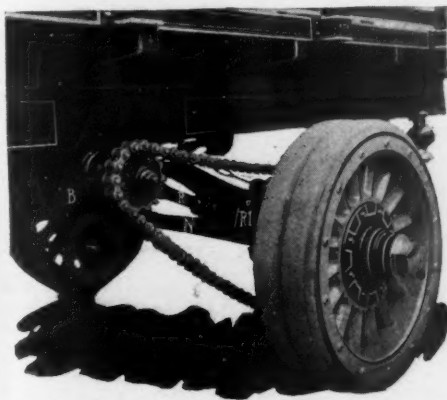
From Injury Is the Main Aim in Trucks

Where the Radiator is Placed in Front it Must Be Protected—Bumpers Being Regular Equipment on Nearly all Trucks—Gearbox and Other Parts Carried Under Frame Members to Aid in Securing Accessibility in the Truck, an Important Feature



KNOX JACKSHAFT BRAKES

On the 5-ton Knox truck the jackshaft brake is an external one made in segments *S* and *S1*, each bearing on approximately one-third the periphery of the brake wheel. These shoes are passed against the wheel through application of the cable *C*, which is by lever. These brakes are outside of the frame members, which is a construction having a considerable following at the present time. In this illustration is also shown the radius rod *R* with its turnbuckle *T* which shortens or lengthens this rod according as it is necessary to tighten or loosen the drive chains. The forward end of each rear spring is carried in a slide block *B* which has its grease cup for lubrication. This sliding block is used in preference to a shackle, in that four leaves can enter the slide block, thereby greatly increasing the spring strength. The cable *C1* is used for applying the rear wheel brakes.



KISSELKAR JACKSHAFT SUPPORT

On a chain-driven truck the proper mounting of the jackshaft with its sprockets for chain drive is an important consideration. On the Kissel truck the jackshaft is suspended beneath the frame members and carries a brake wheel *B* inside of the frame member. This brake wheel takes a band brake used for emergency service. Between the jackshaft and the rear axle is the radius rod *R*, with nut and locknut cam for adjustment. The duty of this radius rod is to transfer the drive of the rear wheels to the side members of the frame. The radius rod must be provided with adjustment in order to tighten the chain when it becomes stretched. Although the front end *R* of the radius rod is comparatively light in structure, the rear portion *R1* is of particularly heavy design. One object of this design is to relieve the jackshaft of unnecessary strain.

the forward end of the subframe, carrying the motor, is supported on leaf springs whose function is the same as that of the spiral springs in the Brodessa and Sampson. On the Stearns the rear ends of the subframe members are hinged on the jackshaft housing.

But the absorption of vibration has not all been accomplished in this way. There are some cases in which the motor is mounted on a subframe rigid with the main frame, but in which suspension short stiff spiral springs are inserted between the motor legs and the subframe. This allows of the motor riding easily on this suspension.

The easy riding of an empty truck has been a problem that has been hard to solve. It is a well-known fact that vibration will rack anything. It is also well known that the springs of a truck are designed to carry its load, whether 5, 7 or 10 tons. Every reader will realize that a spring designed to carry 10 tons will be very stiff and practically amount to no spring at all when there is no load on. It is also well known that trucks travel faster when empty than when loaded. Putting two and two together, the springs are of least value when the truck is empty, and the truck travels fastest when empty. The result is that the truck running empty often suffers more than when carrying its

load. To meet this difficulty has been a problem.

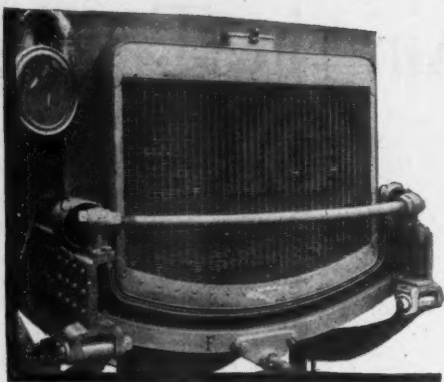
On the 5-ton Sampson truck the question has been wrestled with along three lines. This truck in reality has a triple spring system. It uses in the rear very heavy semi-elliptics, but these semi-elliptics do not bear direct upon the frame members, but upon short plungers which carry spiral springs in short vertical cylinders attached to the truck frame. The idea is that when the truck is empty the body is carried entirely on the spiral springs, and no resilience whatever is obtained from the big semi-elliptic springs, in fact, you have to put on some load before the spiral springs are entirely compressed, and when they are compressed the small plunger carrying them comes against a shoulder on the housing so that the spiral springs are entirely freed from the main load of the truck.

But the Sampson has still another spring feature in the form of a transverse inverted semi-elliptic located above the rear



KNOX SPRING BLOCKS

In pleasure car construction the ends of the spring invariably end in an eye hole formed by curving the top leaf, and through the eye hole the spring shackle bolt passes. With the exceptional load of 3 and 5-ton trucks it has been customary to adopt what is known as the spring block, illustrated herewith in conjunction with the Knox truck. The spring block *B* is bolted to the frame and carries a bearing plate *P* against which the long upper leaf of the spring bears. A grease cup is used to lubricate between this plate and the spring leaf. Using a spring block has the advantage of having the ends of four leaves enter the block so that the strength of the spring at this point is that of four leaves instead of one. Using the spring block eliminates the shackle link because when the springs are compressed they slide endwise in the block.



KNOX RADIATOR PROTECTION

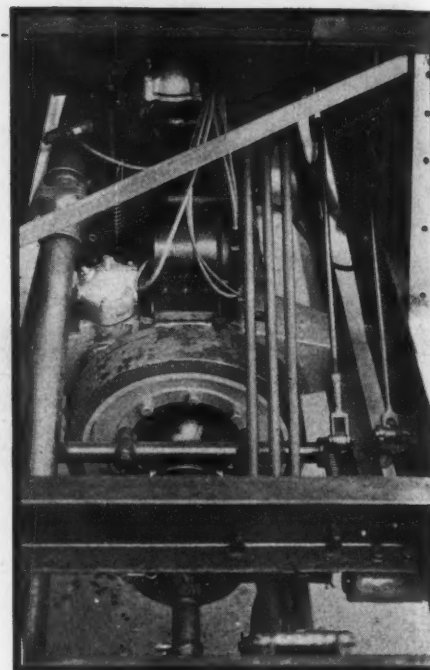
Protecting a radiator is a prime feature in all motor trucks. To do this satisfactorily the Knox company supports the radiator entirely on a leaf spring extending beneath the radiator from end to end and terminating in a coil C at each end. This coil anchoring direct with the side frame member. The resilience of the coil is sufficient to protect the radiator from every form of jar it would receive if supported direct on the main cross member F of the frame. The radiator is protected against damage from other street vehicles by the curved cross bar, which bows outward in front of it. This cross bar is carried in end brackets which bolt direct to the frame. An accessibility feature of the truck, shown herewith, is that the nuts N on all spring clips are at the upper ends, whereas on pleasure cars they are at the lower end or beneath the axle. Carrying these nuts on the upper end adds greatly to the accessibility of the truck.

axle. This is an overload spring and comes into use only on such occasions. When in use it directly assists the side semi-elliptics in their work.

The use of the overload semi-elliptic spring above the rear axle is becoming common. It is an easy spring to install and when in place protects the side spring in case the truck should drop into a deep hole in the pavement or into a rut coming off a bridge. Breaking a spring in a 3, 5, 7 or 10-ton truck is a much more serious proposition than breaking one in a touring car. For this reason there is a greater factor of safety shown in all trucks as compared with touring cars.

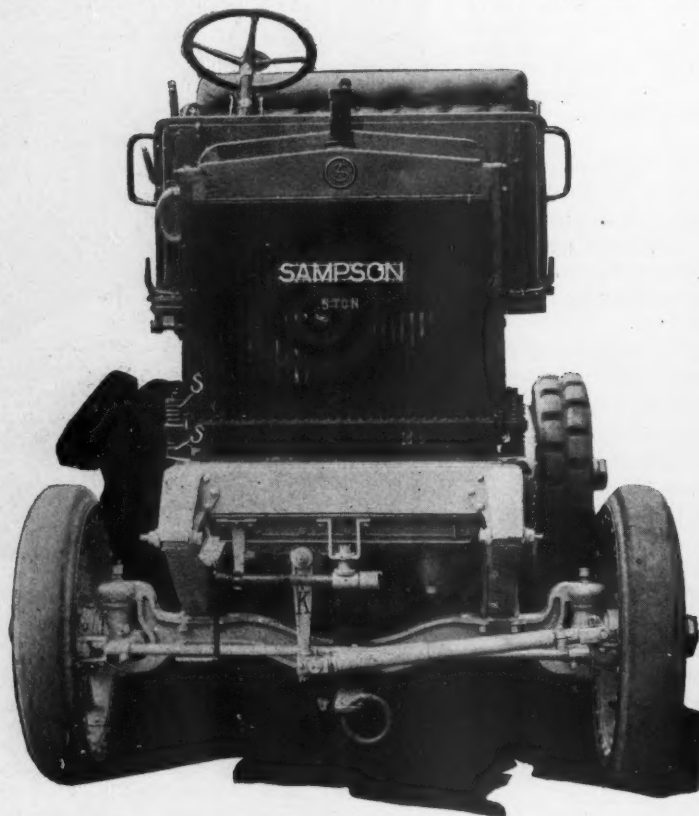
Regarding the style of spring used, it is rather difficult to draw conclusions. On the heaviest types the semi-elliptic is used, and on many 2, 3 and 5-ton trucks the platform system in the rear has been adopted. There is a vast difference of opinion in the employment of the sliding block for springs instead of attaching them to the frame through an eye bolt as in pleasure car work.

In heavy trucks with eighteen to twenty leaves in each spring the top leaf is not strong enough to bear the entire load, as in a pleasure car, so that the spring block has been used, in which the end of the top leaf is flat and rests directly beneath the lower side of the frame member.



SAMPSON MAGNETO LOCATION

That truck design is entirely different from pleasure car design as is shown in the unique position of the magneto on the Sampson truck, illustrated herewith. In this truck the motor is carried on a sub frame and the magneto is mounted transversely in front of the flywheel. It is driven from the camshaft. Placing the magneto in this position gives it an accessible location for a truck with a motor located under the seat.



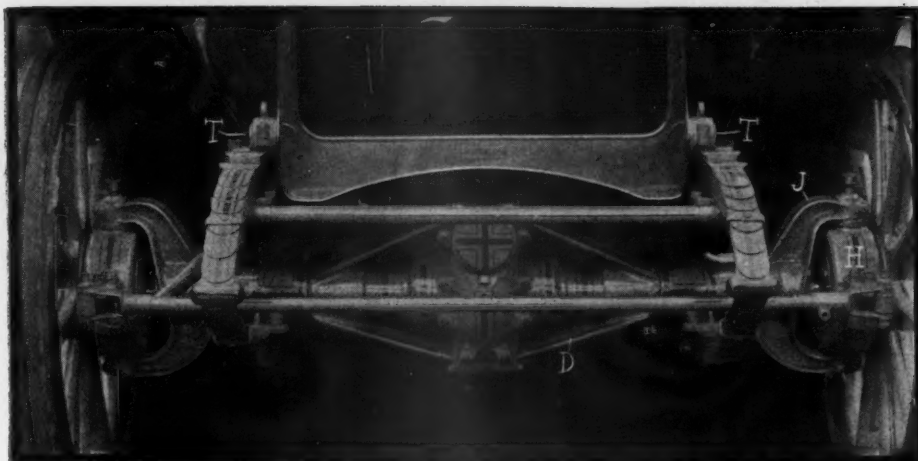
SAMPSON TRUCK DETAILS

This front view of the 5-ton Sampson truck shows some details which are characteristic of truck design. One is the folding starting crank K which, as illustrated, is carried on a U-shaped bracket from the cross member of the frame. As shown, the crank is carried crosswise where it is out of the way and well protected. On trucks the starting crank is in greater danger of being injured than on touring cars, consequently the necessity for the hinged type. This illustration also shows the mode of carrying the radiator between the coil springs S to free it from the vibration of the truck.



BRODESSER MOTOR FEATURES

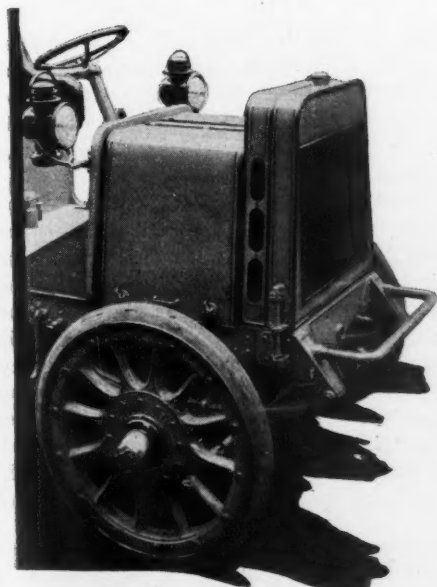
On the Brodesser truck the motor is located beneath the floor boards and the gasoline tank beneath the seat. By the removal of doors, as illustrated, access to the motor is obtained at either side and there is equal access to the gasoline tank. A most flexible radiator support is used on this truck, and it consists of carrying the radiator at each side on a vertical rod R. On the radiator are two brackets B and B1, the lower one is carried between coil springs S which support the radiator. The upper bracket B is merely a guide on the vertical rod.



ROVAN FRONT WHEEL DRIVE

The only commercial type exhibited at the show with front wheel drive is the Rován. The method of drive is simple. The forward axle is a housing with a diamond-shaped forging D supporting the differential housing within it. The end of the axle carries the steering jaws J. Within the housing H is a universal joint in the driveshaft, so that turning the wheels to right or left is made possible by this joint. The rear axle in this truck is a standard type. It is somewhat unusual that full elliptic springs are used in front, but in the Rován case these are swung beneath the axle to keep the motor as low as possible. The radiator is supported on trunnions T on each side. By a trunnion is meant a short horizontal stud which is carried in a bearing on the frame. This gives a fairly flexible radiator support.

Truck Competes with Electric Trolley



MAIS TRUCK RADIATOR

The forward end of the Mais truck is of characteristic design. The radiator, as shown, is supported at each side on a coil spring surrounding a vertical stud, which stud is anchored at its base in the side member of the frame. Back of the radiator is what appears to be an extra radiator thickness with three oval-shaped holes in it. These are simply ventilating openings to admit air around the motor. The radiator is protected by a heavy bumper anchored to the frame side member at each end. The bonnet on this truck appears particularly short, but the motor is compact, having the cylinder cast in pairs. This truck is fitted with left-hand control, and is designed to carry from 1 1-2 to 2 tons. The 3,000-pound truck has a load platform 8 1-3 feet long and 4 feet wide, and the 2-ton truck has a platform 11 feet long and 5 feet wide. Both have four-cylinder motors, 3 7-8-inch bore and 5 1-2-inch stroke. The horsepower rating is 24.

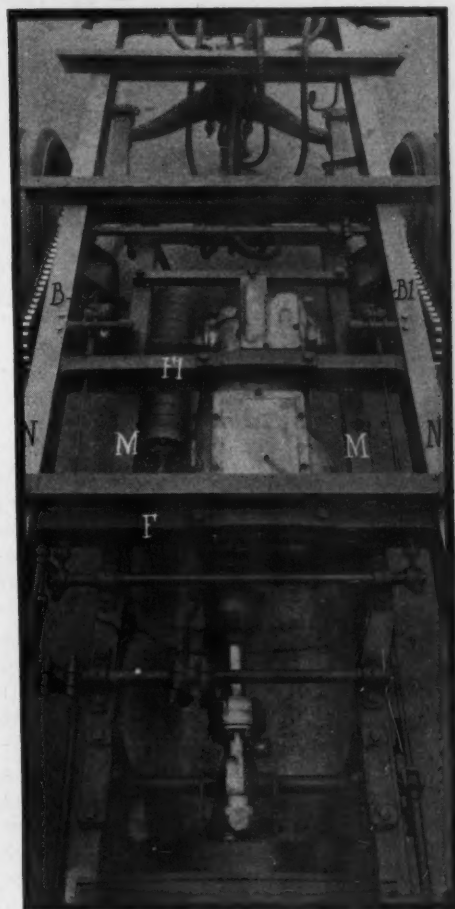
FEW people have had the confidence in the motor truck that S. A. Lewis, New Haven, Conn., possesses. For years Mr. Lewis was a devotee of the horse. He conducted a unique business in New Haven, owning, as he did, 100 horses and renting them out at the rate of \$1 per day without harness. Some years ago Mr. Lewis conceived the idea of making money out of the motor truck. It was in the early years of the four-cylinder Knox machine. In order to work out his ideas he bought three trucks, fitted with bodies resembling small street cars. He established a circuit, starting from the City Commons and embracing Groves street. On this circuit he carried passengers at 5 cents each, competing directly against the electric trolley cars and soon securing a well-paying clientele.

When the service started everybody laughed, and even the Knox people were diffident about the installation of the system. But the organizer had settled the question in his own mind. The two trucks operated upon a perfect system, their running schedule scarcely varying 15 seconds. This regularity greatly impressed the New Haven citizens. To them it was superior to trolley service. So satisfactory did the system prove that the two original buses were not adequate to care for the traffic. A third was installed and then a fourth, and now plans are on foot to add more in the near future.

Last year, from inside reports, Mr. Lewis had a net profit of more than \$11,000 from his three pay-as-you-enter cars. At the present time he is carrying 10,000 passengers a week. Last year the three trucks covered over 50,000 miles.

In order to care for his present business, as well as for future developments, Mr. Lewis is building a \$40,000 garage on Grove street, which will prove one of the best in that section of the country when it has been completed.

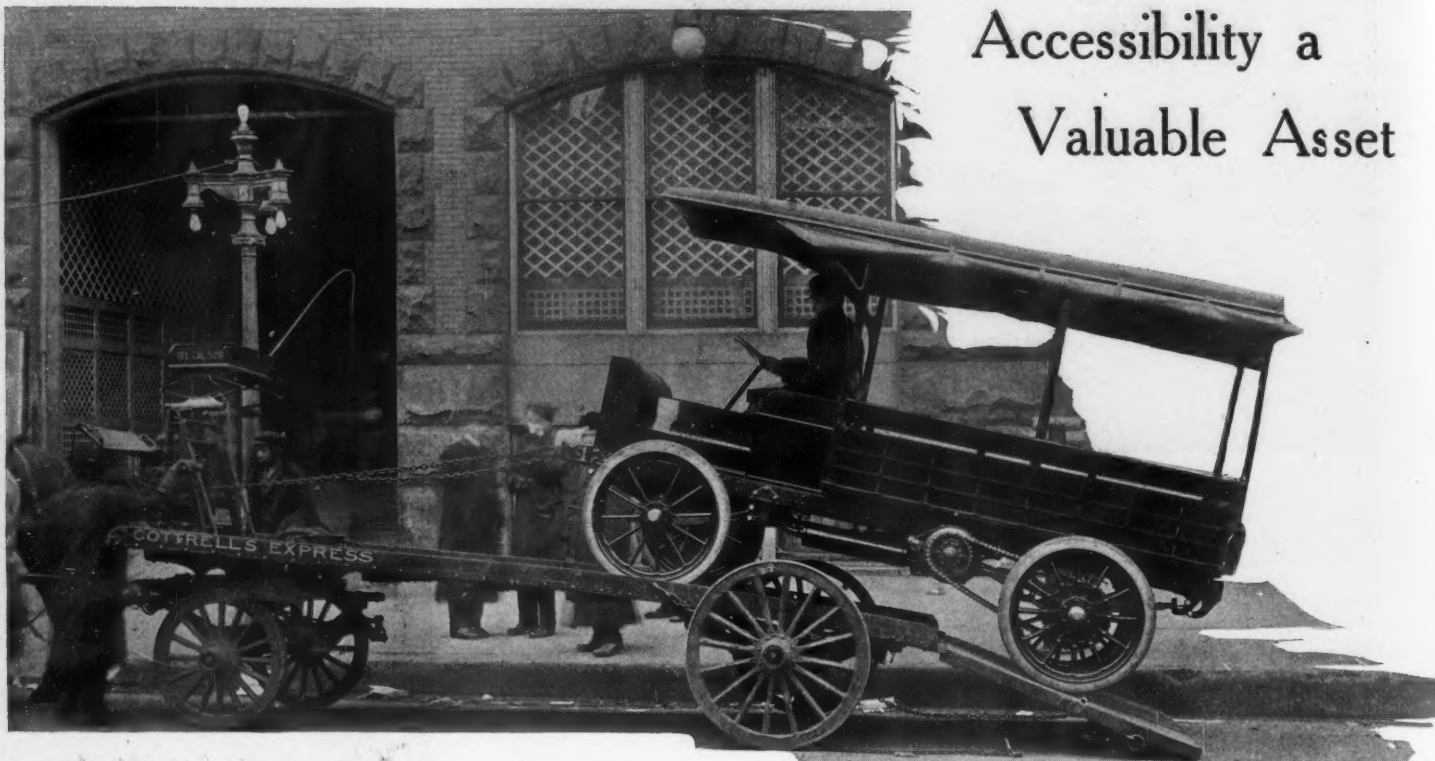
The one feature of the truck in which economy is obtained, as compared with traffic on a street car, is that but one man per truck is needed. This man serves as driver and conductor. The passengers all enter at the front and paying as they enter makes it possible for the driver to act as collector or conductor also and thus cut down the expenses.



MACK UNDERSLUNG GEARBOX

Accessibility is always paramount in commercial cars. It is not enough to have the motor in a truck accessible, but the gearbox also must be accessible. The gearbox has to be located under the load platform, which has to be a heavy construction. In the Mack the gearbox is supported beneath the two cross members F and F1 of the frame, so that to take the gearbox out it is dropped thus not calling for the removing of a single board in the load-carrying platform. Where the gearbox is carried above these members it would be necessary to remove the load platform before it could be removed. This illustration shows the Mack method of using two brakes B and B1 on the jackshaft, and locating them inside of the heavy sills which carry the load platform. On some trucks these brakes are carried outside of the sprockets over which the drive chains pass. On the Mack truck there are really two frames, consisting of inside members N and outside members M, the latter being necessary because of the wide body or load platform used.

Accessibility a Valuable Asset



SOME OF THE COMMERCIAL CARS DROVE UP TO THE COLISEUM IN STYLE,
BEING HAULED THERE BY HORSES

ACCESSIBILITY is the great watchword of all trucks. Some of the makers have realized this and others have not. If the maker does not soon realize the value of accessibility then the consumer will. It does not take an owner long to see that it costs so much per hour to take the motor out of a truck and put it back in as it does for each hour needed in making the actual repair. To explain: Should a crankshaft break the motor must be taken out of the truck, a new crankshaft put in and the motor put back in the truck. If it takes 3 hours to take the motor out, 3 hours to put the new crankshaft in and 3 hours more to put the motor back in place in the truck, then two-thirds of the repair bill has been on the work of taking the motor out and putting it back in again.

Contrast the case of this motor with that in another truck in which the motor can be removed in 20 minutes and put back in the same time. The saving in repair bills will be big in a year. It is an accepted fact that trucks must be overhauled once a year or oftener, and when the truck is given this annual looking over the cost of the bill will depend very largely on the accessibility of the many parts, because if the parts are assembled, making it difficult for the owner to repair, replace or adjust parts, then it will be equally difficult for the repair force to overhaul the machine.

Many buyers are apt to not place enough importance on accessibility. One salesman says that "the truck will run indefinitely without ever having to be overhauled." The business man knows better; everybody

knows that the best of machinery wears out and in these early days of the commercial car industry it would be preposterous for any maker or dealer to try to claim that the parts of his truck would never wear out. They will wear out and they will have to be repaired, and the amount of the repair bill will to a certain extent be according to the lack of accessibility in the car or truck.

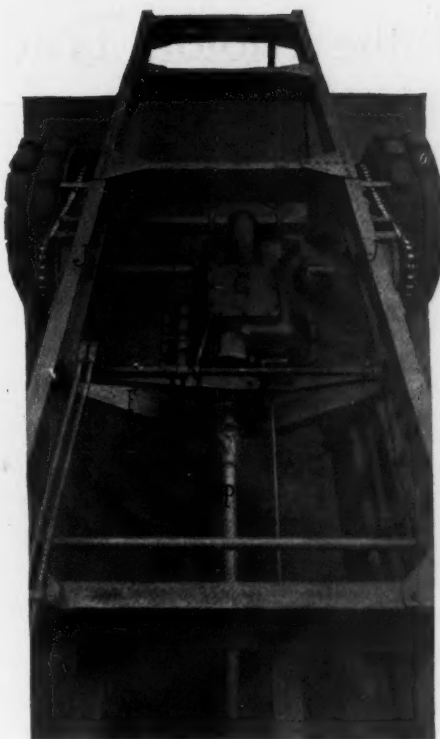
A few examples of accessibility will show how the makers have aimed to meet the wishes of the buyer in this one great respect. They know that their truck must be accessible in all its parts where accessibility is possible in order to sell. Many examples of accessibility were dealt with in connection with the trucks recently ex-

hibited the the show in Madison Square garden, New York. In Chicago the accessibility is also marked, in spite of the fact that many of the cars that exhibited in New York are showing in Chicago this week.

In the 1-ton Federal trucks the gearbox is not bolted to its support at the forward end. The gearbox is a unit with the jackshaft and differential housing, the whole resembling a unit gearbox and rear axle system in a pleasure car. The jackshaft housing is carried beneath the frame side members and the forward end of the gearbox on a cross member of the frame. On this cross member are two horizontal U-shaped supports extending rearward with the open part of the U to the rear.



KELLY TRUCK BUILT FOR CHICAGO PACKERS



KNOX GEARBOX SUPPORT

The Knox company, which was a pioneer in the heavy truck line, solved at an early date the expediency of having a readily removable gearbox G. This gearbox is supported at its front end on a cross frame member F, which is bowed downwards to form the bed for the gearbox. Its rear support is in two braces B from a frame cross member. The jackshaft J is also shown and it is carried in brackets beneath the side members of the frame, thereby allowing of removing the gearbox without interfering with the load-carrying platform of the truck. The propellorshaft P, which transfers the power from the motor to the gearbox, is shown.

The forward end of the gearbox is carried in a cross piece that hangs in the two U-shaped pieces. The end of the gearbox has a swivel motion in the supporting bracket, giving a true single point of support in front and two supports at the rear end. In removing the jackshaft and gearset it is simply necessary to remove six

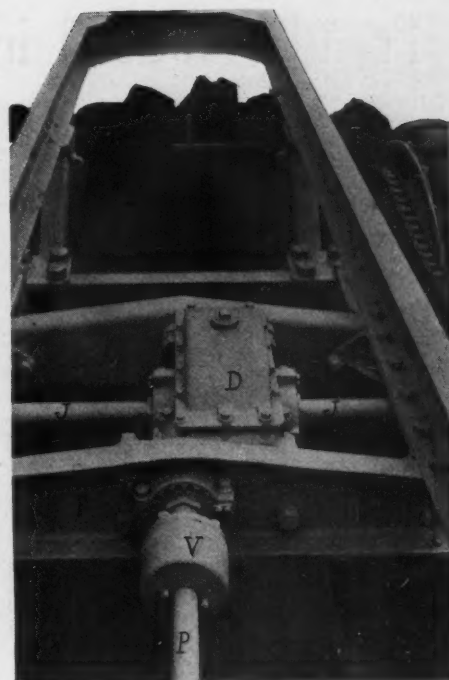
bolts holding the bracket carrying the jackshaft from the frame at each side. Once this is done carrying the gearbox a few inches to the rear drops it free at the forward end. This entire job can be done without lifting a floor board in the car, or if the car were loaded it would not mean any inconvenience to the workmen on the job.

Nearly all of the big makers have seen the advisability of so building their trucks that the gearbox can be dropped out of position instead of having to remove the load carrying platform and raise the gearbox. This means that the gearbox is suspended underneath the frame cross members instead of over them, as in pleasure car practice.

The removal of the motor is generally attendant with much work, but many are trying to eliminate it. Where the sub-frame pieces carry the motor it is possible by hinging these members to a main frame crosspiece to withdraw the hinge bolt and drop the motor out underneath the car. This is being done by three or four concerns and will be imitated by others before the year is over.

The tire problem, which has been put down at 75 per cent of the maintenance of a truck by some makers and higher than this by others, depends largely for its solution on the truck design. Where the load carrying platform hangs back of the rear axle it is necessary to use dual tires on the wheels. It is customary to use dual types on the rear wheels of all 2, 3, 4, 5 and 10-ton trucks but it is mandatory where 80 per cent of the load is supported on the back axle. By actual count there are three times as many trucks using the dual rear tire as there are using the single type. The single is used everywhere on front tires but not so in the rear.

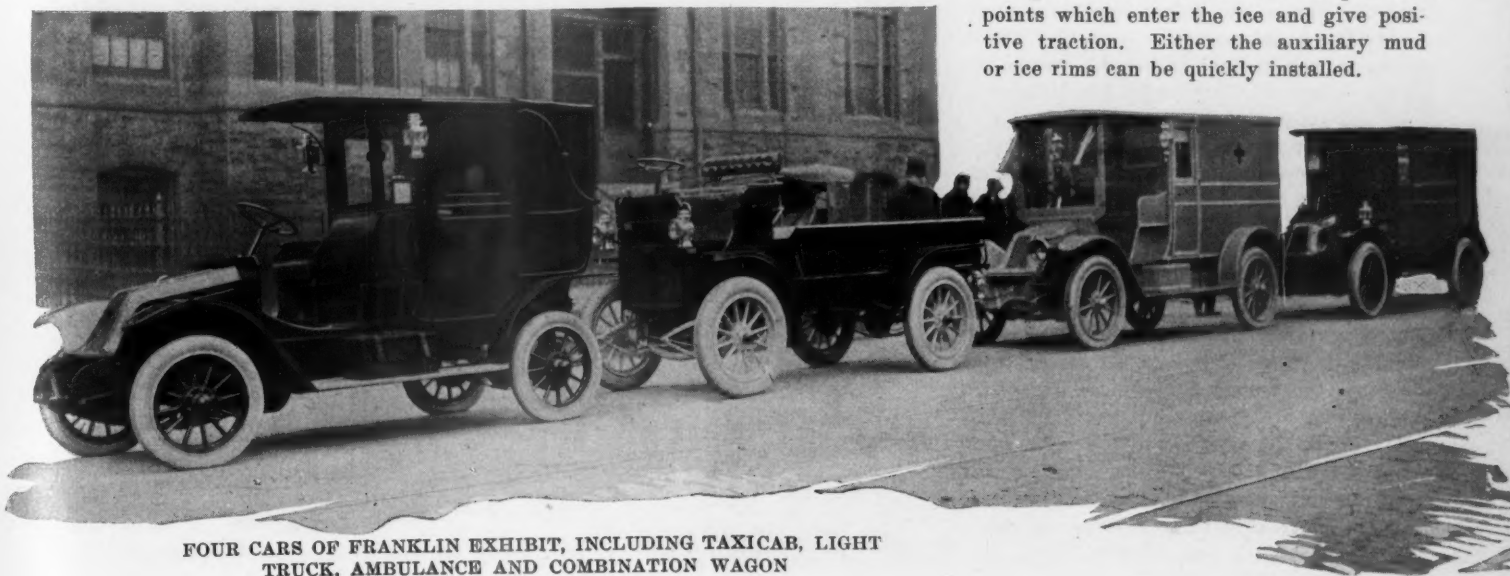
In the tire field the Avery tire system cannot be overlooked. Many of these vehicles are built specially for farm use and when intended for this sphere are sold with what might be called a spare rim which attaches to the outside of the regu-



HEWITT DIFFERENTIAL SUPPORT

The support necessary for the different parts in a 10-ton truck is aptly illustrated in conjunction with the Hewitt, in which the differential D, as well as the jackshaft J, is carried between two huge channel cross members F, much larger in size than the side members of the frame in an ordinary car. The differential housing bolts rigidly between these two. The transfer of power from the planetary gearset is through the propellorshaft P with its universal joint V. It should not be overlooked that both cross members F are carried beneath the side pieces of the main frame.

lar wheel making a very broad tire effect to prevent the wheel sinking into the soft soil. In the rim of this auxiliary wheel are hinged flaps which swing outward from the wheel as it sinks into sand or mud, these flaps forming mud or sand hooks to increase the traction of the vehicle. The Avery company has another auxiliary wheel or rim attachment to the regular wheel when traveling over icy roads. This auxiliary wheel has nothing that touches the ground but a series of sharp metal points which enter the ice and give positive traction. Either the auxiliary mud or ice rims can be quickly installed.



FOUR CARS OF FRANKLIN EXHIBIT, INCLUDING TAXICAB, LIGHT TRUCK, AMBULANCE AND COMBINATION WAGON

Trends Noticed in the Construction of the Motor Truck



TRUCKS OWNED BY CHICAGO BUSINESS HOUSES LINING UP FOR
START OF THE PARADE LAST MONDAY

FOLLOWING the trend of mechanical construction in the trucks of today is much of a different proposition from looking into that of the pleasure car of 6 or 7 years ago. The truck today is just as far advanced in many respects as is the pleasure car, even if not along exactly identical lines. A few examples will suffice: On many trucks the dual system of ignition is used the same as on pleasure cars. The dual leads all other systems both in the present Chicago show and that held in New York. Next to the dual system comes the single ignition scheme with the double system a very poor third. The growth of dual and single systems is another way of commenting on the growth of the magneto and its reliability. The idea of two magnetos being necessary on a truck has ceased, indeed it is only on freak racing cars that double magnetos have had much use.

The many motors used on trucks seen in the Coliseum and also in Chicago are in most cases built by the companies building the trucks but in others are used what might be called the stock motors as built by such concerns as Continental, Rutenber, Northway, Milwaukee, Reeves, Waukesha, Beaver, Davis, Brownell and many others. Not a few of these concerns have brought out special motors for truck uses. In nearly every case these motors are slow-speed types with long strokes. They are

always fitted with a governor which is set to cut down the carbureter supply at any desired speed. On some types they cut in at 8 miles per hour and on others at 10 or 12 miles per hour. Instead of making them cut in at certain speeds in miles per hour other makers prefer to have them cut in at certain crankshaft speeds such as 900 or 1000 revolutions per minute. In either case the result is the same, namely the driver cannot speed the motor up and ruin it as he might do if he got stuck or mired in bad places.

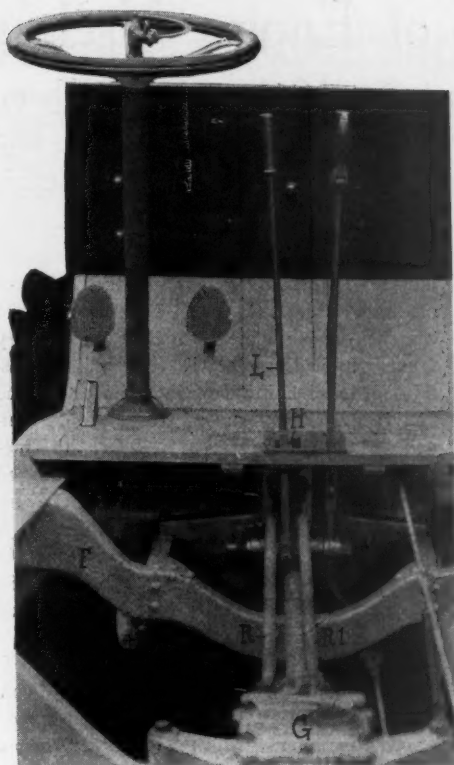
The strength of these special motors has been well looked to and if a person could

see many of the internals of the big truck they would be as much impressed with their strength and volume as they are with the heavy axles and huge springs. In one four-cylinder motor used in a 3-ton truck the cylinders are cast in pairs and three bearings used to carry the crankshaft. The total length of the three bearings is $15\frac{1}{2}$ inches, distributed with $6\frac{1}{2}$ inches at the front end, $3\frac{1}{2}$ inches in the center and $5\frac{1}{2}$ inches at the rear. The diameter of the shaft throughout is $2\frac{1}{2}$ inches. And what is true of the strength of the crankshaft is also true of many other motor parts.

Nearly every truck builder has started



MUNICIPAL MOTOR WAGON SHOWN BY THE STUDEBAKERS



ADAMS LEFT-HAND CONTROL

On the Adams chassis left-hand control is used, but the change speed and emergency brake levers are located in the center of the floorboard where they can be operated with the right hand. This feature of design appeals to many car buyers whose drivers object to using the left hand for operating the change-speed lever. The location of the clutch pedal, the brake pedal, and the accelerator is standard. Placing the change-speed lever L in the center allows of a symmetrical arrangement of the shifter rods R and R1 which connect with the sliding units in the gearbox G. It is simply necessary to rock the lever from one slot to the other of the quadrant H in order to pick up the different sliding units. The sub frame construction, on which the motor is supported, is shown, as is the method of mounting the steering gear between the side frame and the sub frame members on the left. Using heavily dropped cross frame members F lowers the center of gravity of the car.

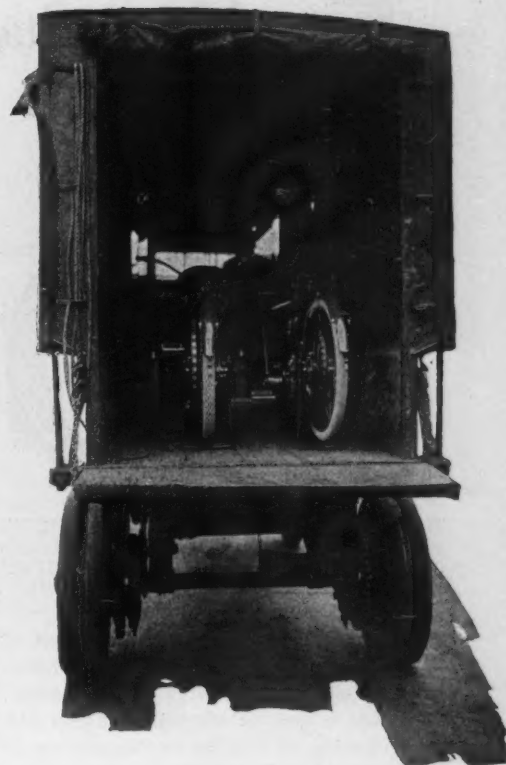
out with his pleasure car motor for his first truck. He imagined it would only be necessary to gear properly between the motor and rear wheels in order to accomplish the best results. Although some have continued this policy many have brought out an entirely new motor, based largely on the pleasure car design but with a long stroke, a governor, and heavier crankshaft, connecting rods, pistons and all other parts.

One respect in which trucks differ radically from touring cars is in the use of the tubular radiator. The cellular radiator, or the honeycomb type, as it is familiarly styled, is a leader in pleasure cars but in trucks the opposite is true. It is accepted that the cellular type gives greater efficiency than the tubular and it is also accepted that the cooling problem in a truck is much greater than in a touring car because of the slower speed at which it operates. With both of these facts taken

together it is rather surprising that the cellular has not been given more consideration. The reason is that it is not so robust and will not stand the constant jarring that the tubular type will. Now that the radiators are carried entirely on springs at either side it is questionable if some concerns will not adopt the cellular type as has been done by several makers in Europe. In Europe the roads are much better and so it is possible to make more use of the cellular design. With the present advancement in flexibility of support shown on American trucks it will be surprising if some concerns will not adopt some sectional type of cellular radiator within the coming year.

The lubricating of a motor is more important in a truck than in a touring car if such is possible and in view of this there is little wonder that the circulating oiling system is a big leader. It leads all other systems more than three to one and is gaining every month. With some this oiling system consists only in maintaining a splash level in the crankcase but in others the crankshaft is drilled and so are the connecting rods so that the oil is fed by direct pump pressure to all of the crankshaft as well as the upper and lower bearings of the connecting rods. In addition to this is the crankcase splash system supplied from the over flow. Next to the circulating system is the mechanical type, then come those in which the oil is fed with the gasoline as in the majority of two-cycle types and lastly the ordinary compression oil in which a pressure generated by the exhaust pressure forces the oil to the motor parts.

Leaving this consideration of the motor power in trucks and looking at the trans-



TRUCK HAULS MOTOR CYCLES

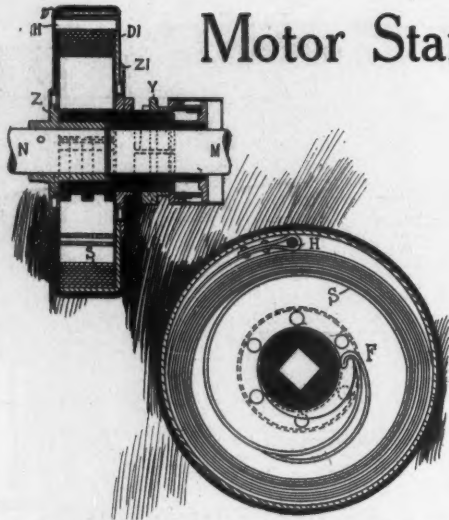
mission system it is surprising to note the lead that the selective set has and yet its lead is not nearly so great as in the pleasure car field. It has a lead of almost two to one over the planetary set which comes second. Third place goes to the friction system and last position to the progressive sliding set. There are many makers who want to get away from the gearset question and the shifting of gears for use on commercial power wagons.



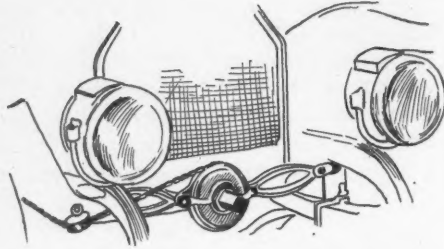
ROVAL, WHICH USES WORM DRIVE AND HAS OTHER NOVEL FEATURES

Motor Starters Make Cranking of Engine Useless

Arrangements by Which Motors Are Made to Crank Themselves—Automatic Methods—Pneumatic, Mechanical and Electric Engine Starting Systems—Pedal and Lever Schemes



THE GARDNER SPRING ENGINE STARTER M AND N, FRONT AND REAR PORTIONS OF SHAFT; S, SPRING; F, HOOK END OF SPRING; H, DRUM



THE STAR MOTOR-STARTING SCHEME THE ENGINE IS CRANKED BY PULLING A LEVER ON THE SIDE OF THE CAR BESIDE THE DRIVER'S SEAT

ONE of the greatest disadvantages of the usual gasoline engine as applied to motor cars is its inability to start itself. With the steam or electric vehicles the mere opening of a valve or the moving of a controller handle is sufficient to start the motor. In a gasoline engine or other motor of the internal combustion type, it is necessary that one cylinder have a charge of fuel compressed within it and that this charge be ignited before the motor takes up its regular cycle of operations. The usual provisions made for this purpose consist of a crank by which the motor is turned over by hand and this first charge of fuel compressed and ignited during this hand revolution.

Making It Easy to Start

Motor car users are becoming more and more averse to unnecessary labor and inconvenience in the operation of their cars, the ideal of many of them in one particular being a car into which the driver can step and immediately start off. Many gasoline motors and most of the six-cylinder ones often can be started on the spark; that is, where the fit between the piston and cylinders is tight and the motor has not been standing for a great length of time, there often is sufficient compressed fuel in one of the cylinders with the distributor in

position to ignite it, so that the mere completion of the electric circuit will cause the initial explosion. This method has its drawbacks in that it cannot be relied upon, further that when the motor does start on the spark, the inertia of the parts which are so suddenly set into motion results in great strains on the motor.

Added to the labor and inconvenience involved in cranking a car by hand there is the liability of accidents due to the back kick of the motor when ignition takes place before the piston has reached the end of its stroke. These considerations have called for the introduction of engine starters by which the motor may be made to take up its cycle of operations without hand cranking.

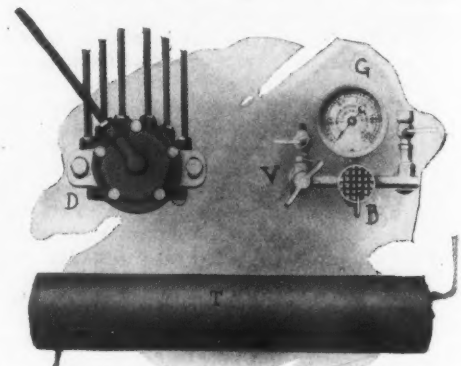
Starters of Varied Kinds

These starters are of several different kinds, but may be divided into two main classes; those in which the motor, during its previous operation, stores up power which may be released at will to start it again, and those in which the motor really is cranked by hand or foot power but is cranked from the seat, either by means of a lever or foot pedal. In the latter class arrangements are usually made whereby the starting device is disengaged in case of a back kick. Those in which the engine

stores up the power for its next starting are either electrical, mechanical or pneumatic or combinations of these. In the electrical starters a small generator driven by the engine charges a storage battery from which the electric energy is transmitted to either a separate motor or the generator acting as a motor and connected to the crankshaft. In the mechanical starters the engine is arranged to wind up a spring which may be released at will and turn the engine over a few revolutions, while in the pneumatic starters compressed air or gas is stored in a tank and is later introduced into one of the cylinders to move the piston.

Winton Self-starting System

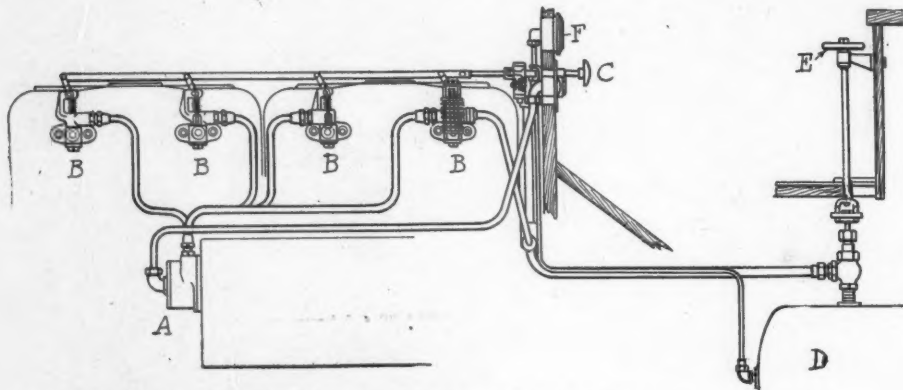
The self-cranking system employed on the Winton six-cylinder car is of the pneumatic type, as it uses the exhaust gases of the motor, allowing them to be stored



DETAILS OF WINTON SELF-STARTER D, DISTRIBUTOR; T, AIR TANK; B, PUSH BUTTON; V, SHUT-OFF VALVE; G, PRESSURE GAUGE

up in a tank during the exhaust stroke. Attached to the two middle cylinders of the engine are outlets through which a small portion of the exhaust gases pass to a pressure tank carried between the left frame rail and the driving shaft. The gases are forced into the tank upon the exhaust stroke of the motor, and the condensation in the tank is said to be sufficient to remove from the gas any oils or carbon particles in it.

Two ball valves in the pipe line between the cylinders and the tank prevent the escape of gases back to the cylinder from the tank when not wanted. The storing up of pressure in the tank is automatic, the operation stopping when the tank is full and commencing again when the pressure has been reduced below normal. Another pipe leads from the tank to a gauge and button valve on the dash and from there is led to a distributor on the camshaft of the motor. When this button is pushed the compressed gas flows through the distributor to one of the cylinders



SIDE VIEW OF THE AMPLEX AUTOMATIC MOTOR STARTING DEVICE A, DISTRIBUTOR; B, AIR VALVE; C, PUSH ROD; D, AIR TANK; E, RELIEF VALVE; F, PRESSURE GAUGE; ON THE REAR CYLINDER THE AIR-PUMP IS COMBINED IN B

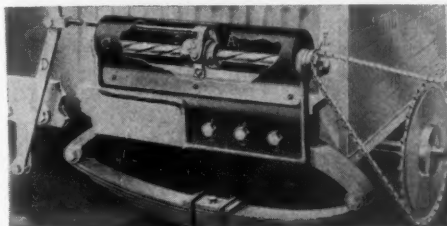
Devices for Starting Engine From the Driver's Seat

Many Attempts to Rival Electrics and Steamers in Ease of Starting—How the Dangers of Back-Kick of the Motor Are Avoided—Some of Them May Be Attached to Any Motor

which is ready to commence the power stroke. The pressure forces the pistons to move and as each piston passes the firing point the motor starts.

Amplex Self-Starting Device

Another self-starting device in which the motor is used to furnish the power for starting is that in the Amplex two-cycle car. This is in many respects similar to that of the Winton, but instead of using the gases in the cylinder the pressure produced by the compression stroke in the cylinder operates a small automatic air pump consisting merely of a piston which

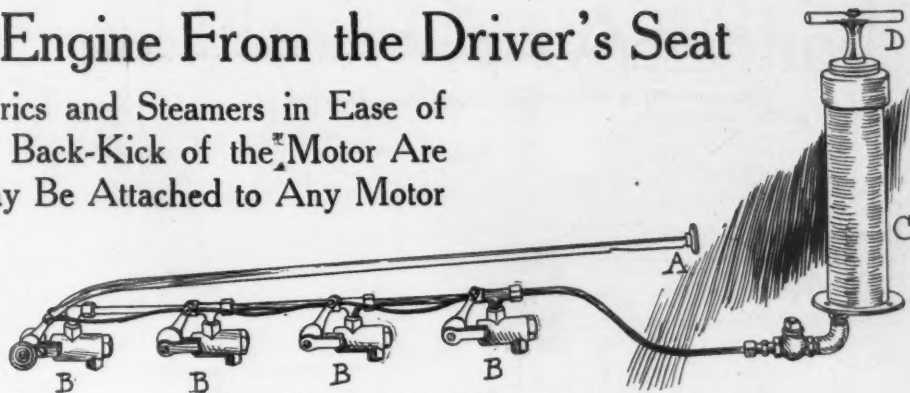


THE KEEN ENGINE STARTER
A, SPIRALLY GROOVED SHAFT; B, SLIDING COLLAR; D, LEVER AT SEAT

is forced upward on the compression stroke and downward by a spring. The air is pumped by this device to a tank and where it is stored under pressure. From there it is led through a gauge on the dash to a distributor on the pumpshaft. A push rod on the dash opens an air inlet valve on all of the cylinders at the same time, the distributor determining the cylinder into which the air passes. A valve just in front of the driver's seat opens the pipe line to the tank and allows the air to escape when the tank has reached the proper pressure.

Another Self-starter

The self-starting feature of the motor of the Automatic Motor and Engineering Co. is only incidental to its other departures from the ordinary type of gasoline engines. This motor in brief consists of a two-cycle motor on the shaft of which is a special air-compressor taking the place of the flywheel. The compressed air is fed through a specially designed vaporizer or atomizer where it is mixed with gas in proper proportions and forced into the cylinder just as the load requires. A pressure tank is carried wherein air is stored for filling the tires and for starting purposes. In this reserve tank the pressure of the air is always in excess of 75 lbs. and the release of a push lever on the dash allows the air in the tank to pass through the atomizer forming the correct mixture with the gas. This mixture passes through a pet-cock to the cylinders, automatically finding the cylinder which is in



THE GRISCO ENGINE STARTER USES A HAND PUMP
A, PUSH ROD; B, B, B, B, SELECTORS; C, COMPRESSOR; D, PUMP HANDLE

the right position for the explosion. The pressure of the mixture of gas and air is sufficient to give the motor a quarter turn permitting it to make the necessary electrical connections for firing the charge and to start on the magneto.

Geiszler Electric Self-Starter

The Geiszler Storage Battery Co. presents an electric self-starting device consisting of an automatically-driven power air pump designed to maintain 150 pounds pressure in an air reservoir. When a switch handle on the dash is moved compressed air is fed through a vaporizer where the air is charged with gasoline and then through an automatic selecting valve which directs the charge to the cylinder. When the switch handle is moved back a spark is made to occur in the cylinder and the compressed charge is exploded and starts the motor.

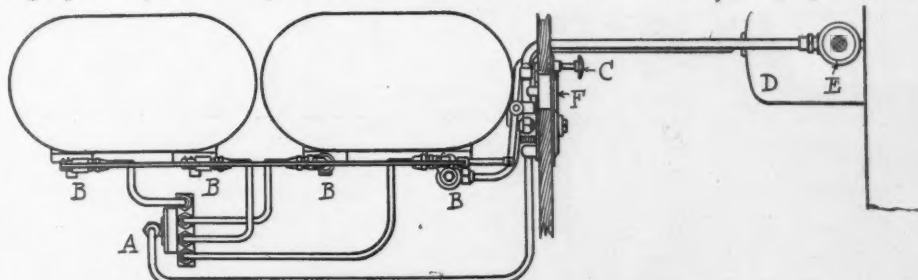
An engine-starting device which operates by the compression of a spring is manufactured by the Gardner Engine Starter Co. This arrangement consists of a drum placed next to the gearset and within it is incorporated a wound-up spring so that when released and with the transmission in direct drive the motor is started. In order to use the starter the propellershaft is divided, one part connecting from the self-starter to the transmission and the other part extending from the former back to the differential. Between these two parts of the shaft is a clutch. One end of the springs fits over a spring in a drum, the other end has a hook by which it can be gripped by a series of teeth in the end of the shaft connecting with the differential. To start the engine the gearset lever is first put in direct or high position, and the spark and throttle

set at starting point. The releasing of the clutch immediately frees the spring and the drum is rotated several times, which also rotates the crankshaft and the motor. As soon as the motor is started the transmission is changed to neutral, when the clutch is automatically engaged and the engine rewinds the spring. This company has incorporated with the starting device a special gearset in the same gearcase and which can be placed in the transmission system instead of the regular gearset.

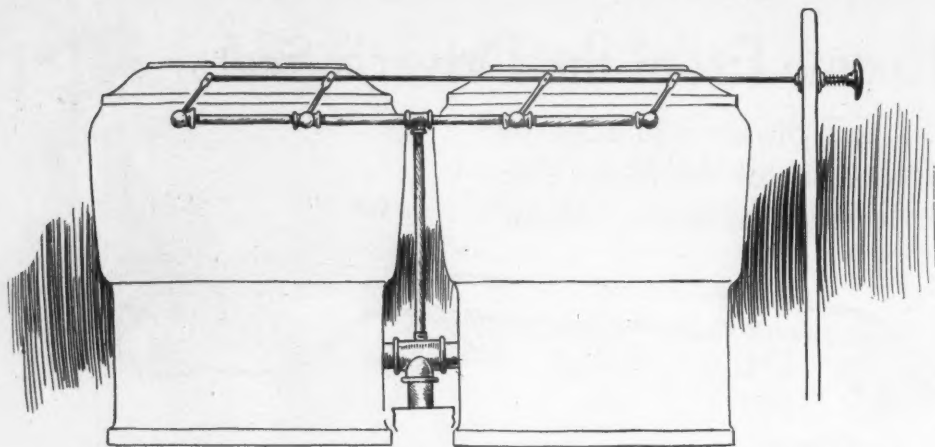
Grisco Self-Starter

The Grisco self-starter marketed by the Ignition Starter Co. is a device by which an explosive mixture of fuel is introduced under pressure into whichever cylinder of the motor is in the proper position for starting on the spark. The self-starter is not connected with any moving part of the engine and it cannot interfere with its regular operation. The apparatus consists of a compressor, selector, push rod and connections. The compressor is a combined air pump, carburetor and gasoline holder and may be placed in any convenient position on the floor or on the side of the car. A tubular plunger contained in the compressor holds sufficient gasoline to start the engine about 150 times. The plunger is worked by hand like the ordinary hand tire pump and on the up-stroke air is drawn through small holes surrounding a gasoline jet just as in the carburetor. By the down-stroke of the compressor the mixture is forced through connecting tubing to the selector, which distributes it to the proper cylinders under pressure.

Another device by which the engine is cranked from the seat is that used in the Star starter. The starter proper is at-



PLAN VIEW OF THE AMPLEX AUTOMATIC ENGINE STARTER
A, DISTRIBUTOR; B, AIR VALVE; C, PUSH ROD; D, AIR TANK; E, RELIEF VALVE; F, PRESSURE GAUGE; ON THE REAR CYLINDER THE AIR-PUMP IS COMBINED IN B



SELF-STARTING MOTOR OF THE AUTOMATIC MOTOR AND ENGINEERING CO.

tached to the crankshaft, the starting crank first having been removed. A short shaft is furnished which engages with the clutch on the countershaft and the starter is lined up with it. A chain runs over a disk and passes through a pulley at the corner of the hood where it is attached to a rod which is connected to a lever at the driver's seat. A four-way clutch fitted to the crankshaft prevents the danger of a kick. When the lever is pulled the crank is spun just as if the hand crank were used while the spiral spring disengages the starting device and brings it back into position.

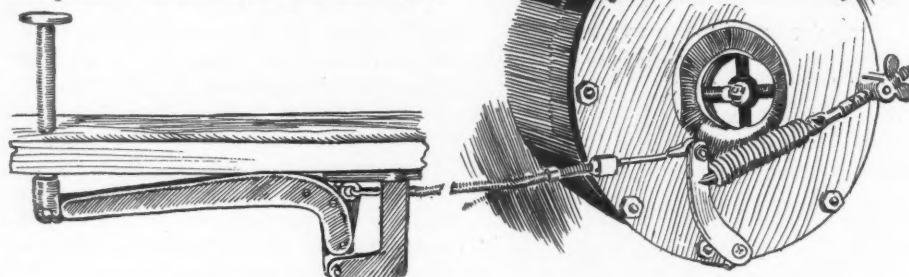
Keen Starter

In the starter made by the Keen Starter Co. the principle of the old Archimedes screw as it is applied today in automatic screw drivers and wrenches is adapted. At the extreme front end of the car and bolted to the side frame is a bearing bolt which holds a spirally-grooved bar at both ends. The rear end of the bar is idle, while at the front end is attached a small sprocket pinion. A long lever is attached to the side frame member at the driver's seat and at the center of the lever is a shaft which connects with a collar grooved to fit the spiral and riding upon it. From the sprocket pinion at the front end of the screw a chain is carried to a large sprocket wheel attached in place of the crank and using the same shaft and pinion as regularly furnished on the car. A pull on the starting lever causes the spiral bar to twist and turn the motor over. A ratchet attachment prevents a back kick.

The Eveready Automatic engine starter is another automatic starter intended

to be operated by foot pressure on a pedal located on the footboard of the motor car.

This device is intended to be placed on the front end of the car on the starting crank-shaft, and resembles in appearance a reversed headlight. It consists of two powerful springs fastened to a central arbor. When these are wound tight they are held in place by a brake band which, in turn, is connected with a pedal release lever. A trip cable runs from the release lever to the footboard of the motor car where it is connected with a bracket and foot pedal. The mechanism of this starter



THE EVER READY STARTING DEVICE OPERATED BY A FOOT PEDAL

is connected to the motor of the car by means of an intermediate shaft with universal couplings. Pressure on the foot pedal releases the brake band of the starter and permits the springs to unwind, turning the motor several times.

If the starter should fail to start the motor the springs would be unwound to no purpose and it would then be necessary to rewind the starter by hand. This can be done with little effort and no danger with a detachable crank furnished with the

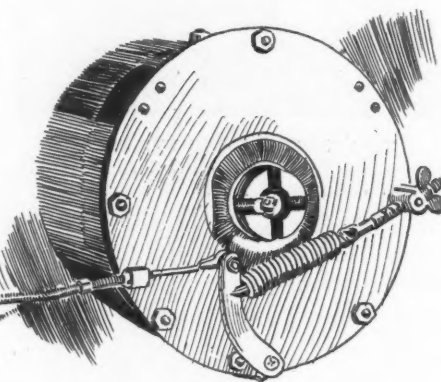
starter. A special feature of this starter is that it is designed to permit of turning the engine over slowly.

Wilkinson Motor Starter

The Wilkinson motor starter with which many of the Lambert cars are regularly equipped, can also be applied to almost any other car. It acts directly on the flywheel of the motor, turning the flywheel over by means of a pawl when a pedal in front of the driver is depressed. The pedal is permanently attached to a cross shaft which rotates when the former is pushed. This in turn rotates a shaft extending to the flywheel causing an oscillating arm to thrust forward and force the shoulder of a driving member against a stud inserted in the face of the flywheel. In this way the engine shaft is rotated fully 180 degrees compressing one cylinder and passing the ignition point each time.

Should ignition fail with the first impulse, the operation can be repeated indefinitely, each alternate cylinder being engaged in succession.

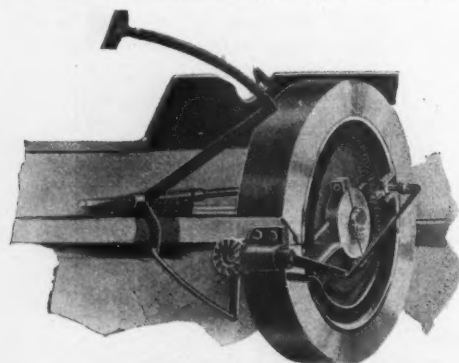
If the motor should back-fire, an eccentric pawl immediately moves the shoulder back



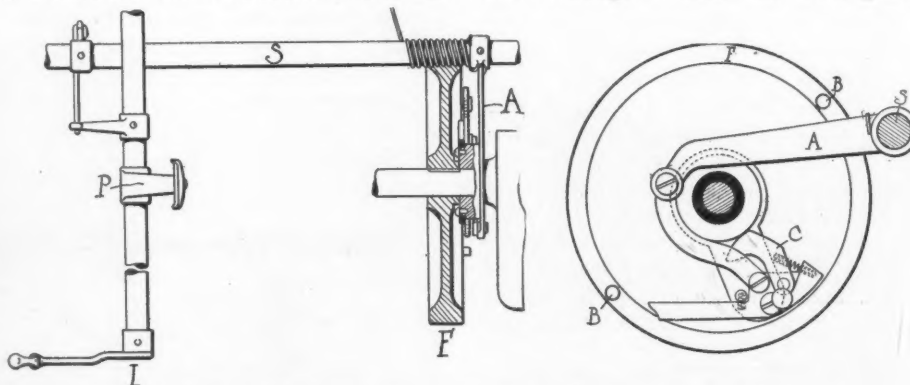
and inward away from the path of the stud allowing the engine to retract without injury to the machine or the operator.

Glenard Starter

A starter of the pedal type which does not depend upon the tension of a spring for its operation is the Glenard starting device. An expanding clutch upon the face of the flywheel grips the latter when the pedal is pressed, turning the flywheel over three times. The motion is imparted to the clutch through a crank and bevel gears.



THE GLENARD STARTING DEVICE OPERATED BY A FLYWHEEL CLUTCH

WILKINSON STARTER USED ON THE LAMBERT CARS
P, PEDAL; S, SHAFT; A, ARM; B, STUD ON FLYWHEEL F; C, PAWL

How the Commercial Motor Cars Are Shod

Pneumatic and Cushion Tires Used on the Lighter Cars—Heavy Solid Tires for the Mammoth Trucks—The Trend Toward Demountable and Detachable Tires for Business Purposes—Block Tires

WHILE the greater resiliency of pneumatic tires has made their use almost as desirable for commercial work as for pleasure vehicles, the nature of the tire itself has prevented its use for very heavy loads. Particularly where high speed has been necessary such as fire-fighting apparatus and other municipal cars, pneumatics have been needed.

The past year has seen the solution of this difficulty to a certain extent at least in the use of dual pneumatic tires, so that practically twice as heavy loads can be carried on trucks thus equipped. In place of having a single tire on the rim, two tires are placed side by side, and have given excellent results on commercial cars carrying as high as 2½ tons. Most of the pneumatic tire makers are showing these dual tires, and practically all of them are of the demountable type.

Dual Pneumatics

With the exception of the twin or dual feature these tires are practically the same as those made for use on pleasure cars and do not need any separate discussion. One of these illustrated here is typical of all of this kind and shows the general features of the dual pneumatics. Among the tires showing these features this year may be mentioned the Fisk, Firestone, Diamond, Continental, Michelin and Goodyear.

As is the case with the pneumatic tires, there is slight difference between the solid tires for pleasure and light commercial cars. It is, however, when we consider tires for the heavier trucks that the radical changes from pleasure-car practice are noted. It has been a problem with makers of solid tires to obtain sufficient length of life and wearing qualities and at the same time have the tires resilient enough to take up most of the shocks encountered in traffic work. Trouble has also been experienced in preventing the tires from

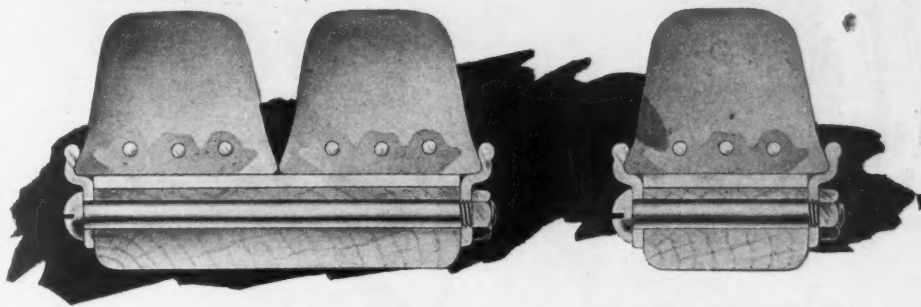


FIG. 2—HARTFORD SOLID TIRE FOR COMMERCIAL USE AS SINGLE AND DUAL

creeping on their rims or tearing out from the fastenings under the strains of heavy loads. Several methods are used to accomplish the desired results of permanent attachment, and good wearing surface, combined with shock absorbing qualities.

Five Methods of Attachment

Makers of tires seem about equally divided between the five different methods of attachment. These methods are the wireless in which the soft rubber wearing surface is vulcanized to a hard rubber sub-base which is in turn permanently cemented to a steel base; second, the cross wire in which pins or wires extend through the base of the tire transversely and are held in place by a hard rubber core; third, a side wire method in which continuous wires extend around the sides of the tire to give a grip for the rim. With this is sometimes combined the cross wire, in which pins or wires extend in which endless wires are imbedded in a hard rubber core in the base of the tire, the softer body being vulcanized to the hard rubber. The last method is that of the wire mesh in the base taking the place of the continuous wires and recently brought out by the Diamond Rubber Co.

In tires for use on the lighter commercial cars such as delivery cars, the field approaches closely that of the pleasure cars, a great many of the lighter commercial wagons being simply pleasure chassis with commercial bodies and carrying very little greater load than their prototypes in the pleasure realm. The single pneumatic tires are much in evidence as are also the solid or cushion tires made especially for this work.

The Motz non-skid cushion tires de-

signed originally for use with electric vehicles are also adapted for the lighter commercial cars. The feature of the Motz tire is the slant-wise bridging between the base of the tire and the wearing surface. These form a support to the sides of the tire and being of solid rubber are an integral part of it. A departure in tires for this year is the twin tread which is undercut at the sides and has bridged openings. It gives additional cushion effect and prevents slipping and skidding.

In the Swineheart line is found a special cushion tire for light delivery cars, the special feature of these being the concave tread which is designed to give more resilience than the ordinary solid tires.

Tires for light delivery work are also represented in the Goodrich line. These are arranged for either quick detachable or clincher rims in all standard sizes and have a dual tread feature. This is obtained by means of a deep depression of the middle of the wearing surface with a wide flare on the sides. A new comer in the field of cushion tires for commercial work is the staggard tread tire for ½-ton cars offered by the Republic Rubber Co.

Wireless Tires

Among the tires for use on commercial cars in which no wires are used for holding the rubber body to the base is the Goodrich wireless tire. This tire consists of three parts: first, a special steel base having dove tailed grooves on the top surface; second, a hard rubber sub-base which is united with a steel base; and third, a soft rubber tread or the tire proper which is vulcanized upon the hard rubber sub-base. A transverse key on the steel felloe band fits into a key seat in the steel base of the tire preventing it from creeping around the felloe. This tire is made in either dual or single form, a feature of the latter being a narrower tread than usual. This is obtained not by less actual width of tread but because the method of construction and fastening allows the twin tires to be set on the felloe band in direct contact with each other. Single and dual tires are made with demountable rims, a feature of the Goodrich demountable being that this rim can be used on any wheel without its being necessary to bore holes in the felloe for bolts. The usual

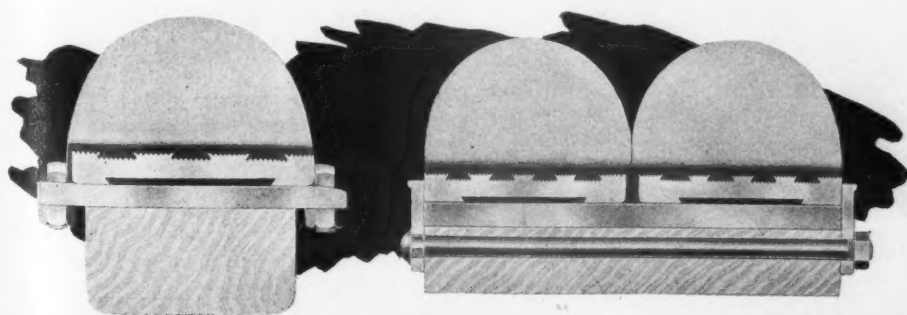
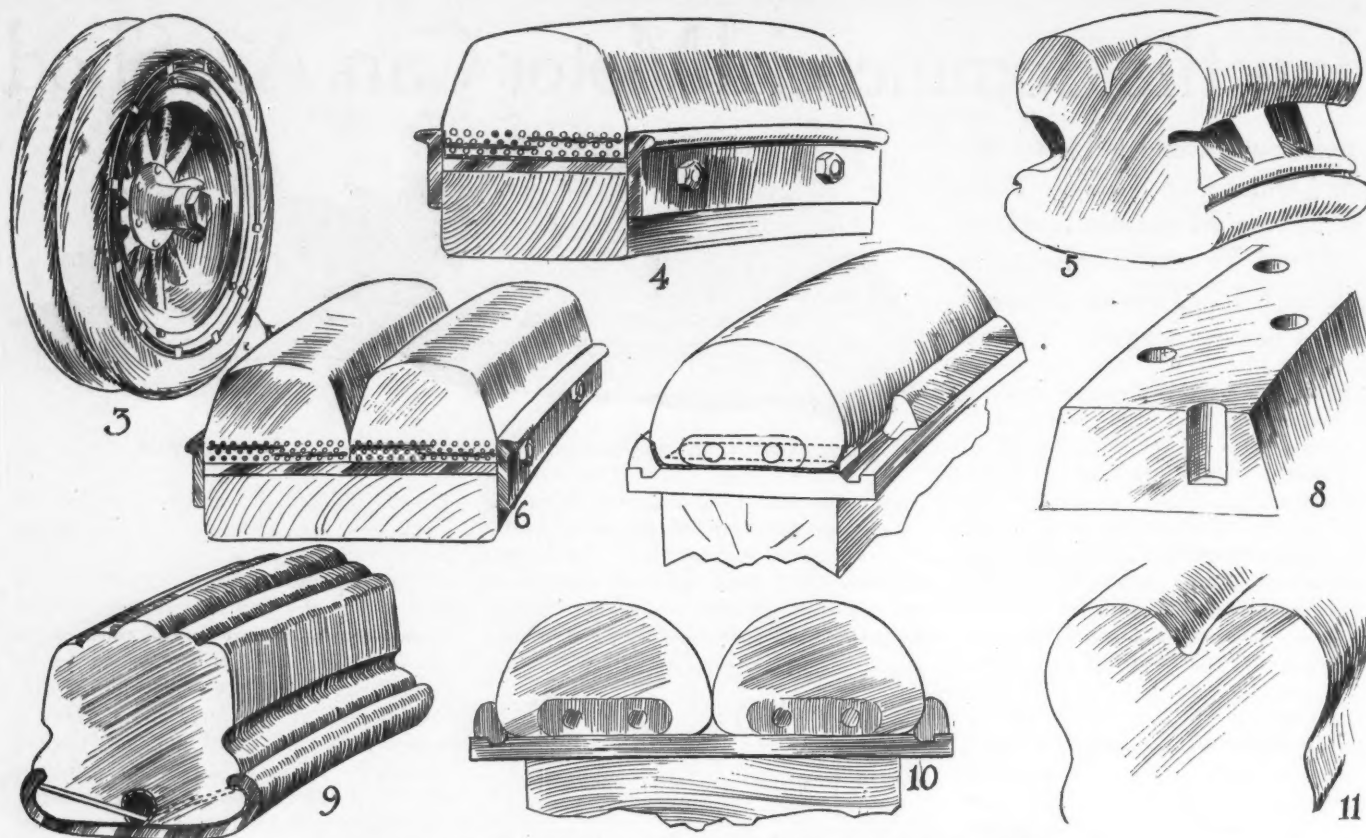


FIG. 1—THE POLACK WIRELESS TIRE IN SINGLE AND DUAL FORM



TIRES FOR COMMERCIAL CARS IN MANY DIFFERENT FORMS

FIG. 3—GENERAL FORM OF THE MANY DUAL PNEUMATIC DEMOUNTABLES FOR COMMERCIAL CARS. FIG. 4—THE DIAMOND SINGLE TIRE WITH MESH BASE. FIG. 5—MOTZ CUSHION TIRE FOR LIGHT VEHICLES. FIG. 6—MESH-BASE DIAMOND DUAL TIRE. FIG. 7—GOODYEAR SINGLE SOLID TIRE WITH EMBEDDED WIRES. FIG. 8—SWINEHART CELLULAR TIRE. FIG. 9—SWINEHART CLINCHER SOLID TIRE FOR LIGHT DELIVERY CARS. FIG. 10—GOODYEAR DUAL TIRE. FIG. 11—GOODRICH RESILIENT TIRE FOR LIGHT COMMERCIAL WORK.

size of wheel with the felloe band is used and upon this is placed wedge shaped rings bored to receive the bolts. The wedging rings are split to permit of easy removal and replacement and no machine is needed for putting on the tires or rims.

A solid tire for heavy service which has come into extensive use in Germany and is being introduced and manufactured by the Pennsylvania Rubber Co. is the Polack tire. In construction it bears a marked resemblance to the Goodrich solid tires, and the method of fastening the tire is practically the same. This consists of a steel band to which the tire is molded and which forms its base. This band has a wedged shaped flat groove on its inner circumference which is filled with hard rubber in order that there will not be a steel to steel bearing surface across the entire width. The outer circumference of the band is cut with V-shaped grooves giving a section very much the appearance of a saw. Upon this is moulded a hard rubber sub-base, and upon the latter the soft rubber body of the tire is vulcanized. These tires are made in both single and dual forms and the manufacturers are now experimenting with demountable rims for use with them. A feature of these tires is the rather unusual depth of the tire body.

In the motor-truck tires made by the Republic Rubber Co. the cross-pin feature is noticeable. This tire is made of one piece of rubber, that is the tread and base portions are inseparable. The base of the

tire conforms in shape to the inside of the clincher flange rim used with these tires but is somewhat wider than the inside of the rim. Through the base of the tire cross wires are inserted at a distance of about $1\frac{1}{2}$ inches apart in order to stiffen the base and make it impossible to pull the tire out of the clincher rim. To the center of the base and extending around the entire length of the tire is a strip of hard rubber which is vulcanized to the tire body. The use of the hard rubber strip is to form a central support for the cross wires and to insure against the displacement of them when severe strains come on the tire. Around the entire base of the tire and covering the ends of the cross wires are placed a number of layers of heavily frictioned fabric. The feature of the hard rubber core is a new one for this year in the Republic line and seems to be gaining in favor with makers of the solid tire.

The Swinehart solid tires are designed

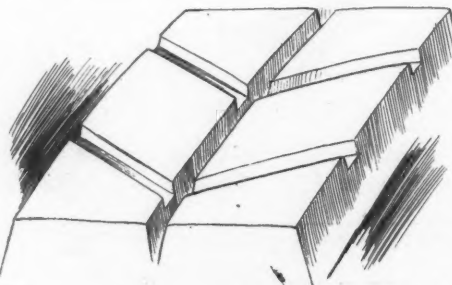


FIG. 12—GOODRICH BLOCK WIRELESS TIRE FOR TRUCKS.

to do away with internal lateral strain, and to adapt the clincher rim principle to flange rims which are held in place by bolts. The base of the tire is a number of layers of fabric impregnated with rubber which is vulcanized to the tire proper. The fabric prevents the base of the tire from stretching and also eliminates buckling. At the widest point of the clincher transverse rods are moulded into the rubber to prevent the tire from squeezing out of the clincher and to allow the flanges to grip it tightly.

Side-Wire Tires

One of the solid tires of the side-wire type is the Firestone tire which has been developed this year as a quick removable tire. Their construction consists of several layers of fabric as a base to which is vulcanized the tire body. At short distances around the tire and just below the edge of the rim are imbedded cross wires, and over the ends of these run two side wires one on each side around the entire circumference. The quick removable feature is very similar to that of the pneumatic Firestone and does not need a description here. This feature of quick demounting is also applied in their dual solid tires for this year.

The Diamond side-wire tires are remarkable in at least one particular and that is the fact that they are made without splices. The spliceless feature while making the process of manufacture somewhat slower will go far toward preventing

water, dirt or other foreign matter from creeping into the tire and toward preventing separation between the base of the tire and the wires. The rubber is forced around the side wires and the body of the tire is built upon this.

Another tire of the side-wire type is the Morgan and Wright solid tire. An endless retaining wire on each side of the tire holds it firmly in the channel rim. These two retaining wires are sprung over the edges of the channel and rest on the ends of horizontal cross bars placed at frequent intervals throughout the length of the tire. The cross bars are held in place by a hard rubber base. The white rubber wearing surface of these tires is one of their distinctive features. The usual fabric wearing surface between the rim and the tire proper reaches up on each side over the ends of the crossbar. These tires appear this year with demountable rims.

Aside from their line of side-wire tires the Diamond company is marketing tires with a base made up of a mesh of fine wires. Into this mesh the rubber is forced and the body of the tire built upon it. These tires appear as either single or dual demountables and the beaded flange shows an unusual method of construction. At the point where the tire is apt to buckle or force the flange out a beaded reinforcement is placed.

The Hartford solid tires consist of three

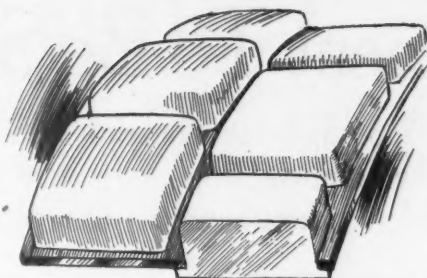


FIG. 13—IN THE KELLEY-SPRINGFIELD TIRE THE UNIT SYSTEM IS USED

endless wires imbedded in a base of rubber harder than the tire body. This hard rubber has a corrugated outline and to it is vulcanized the rubber which makes up the tire body. The inside circumference of the tire is a trifle smaller than the outside circumference of the steel band on the wheel and the tire is forced on over the steel band, creating a pressure against the internal wires, which, in addition to the compression of side flanges, anchors the tires to the wheel. These tires appear as either single or dual demountables. The new demountable used by the Hartford company is the Whittlesey demountable, which can be applied to either single or dual tires. It consists of two split-edged wedge rings, which are held in position by eight or twelve small lugs fastened by bolts. The tires are made to fit any rims of standard make which are now equipped

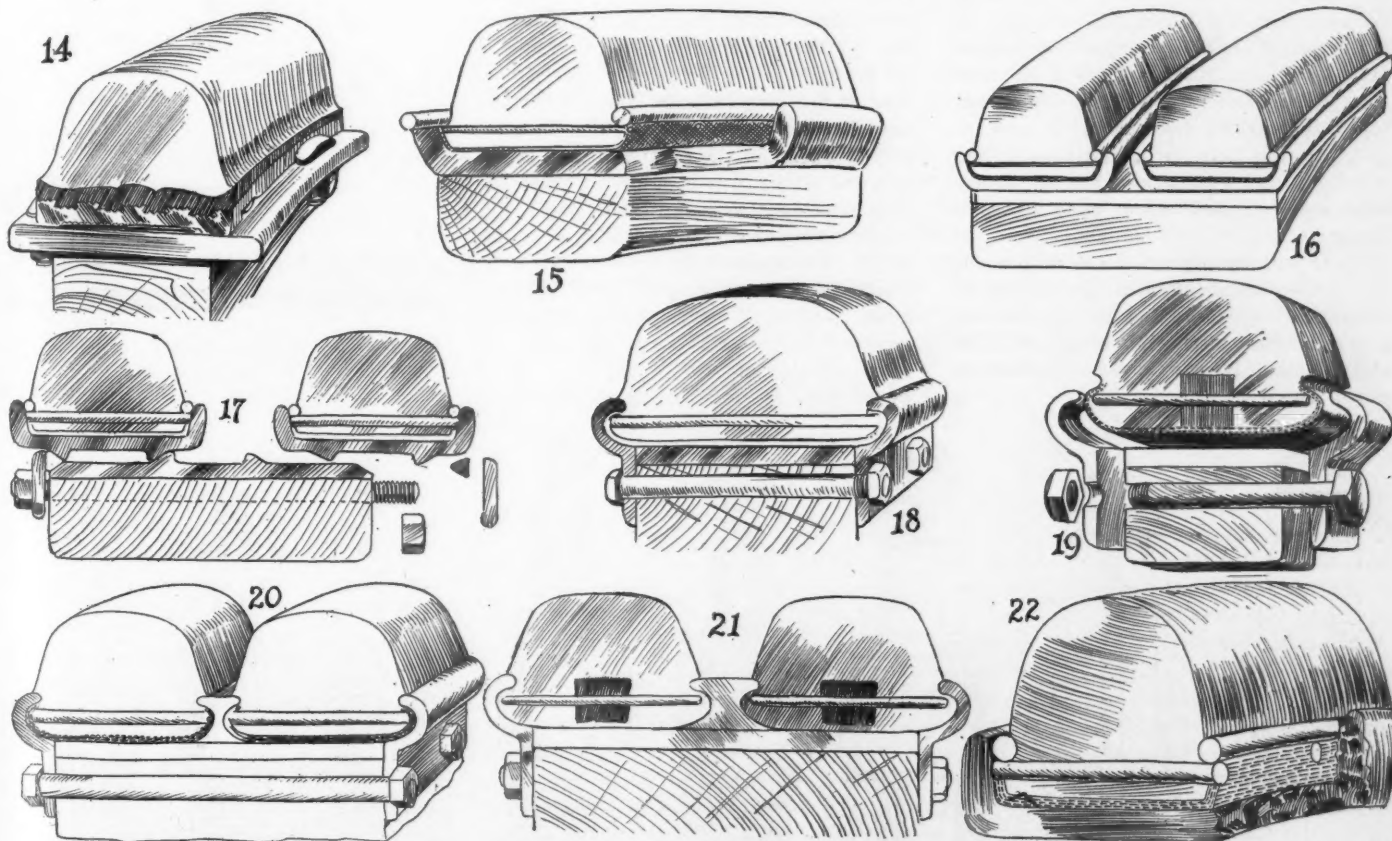
with side flange or side-wire tires.

Another solid tire of this type is the Goodyear product for commercial vehicles. The construction of the tires is quite similar to that of the Hartford. The rubber base, however, is slightly smaller in proportion and the outline of the hard rubber portion, although having small corrugations, is not nearly so uneven as that of the other.

The solid tires made by the Continental Caoutchouc Co. are distinctive in the use of the black rubber body. While this composition has not been so extensively used in this country, it is very familiar to European practice. The Continental solids have the demountable feature in common with most of the others.

Block Tires

A tire which is made up of a series of separate and hard rubber blocks is the Kelly-Springfield tire. A steel band on the felloe is cut out with rectangular staggered holes, into which fit solid rubber blocks having on their lower face an extension or collar. The perforated band is sectional, there being three sections to a wheel. The blocks are slipped through this band from the under side, and it is then clamped upon the felloe, securely holding the blocks in place. This adaptation of the unit idea to tires makes replacement for wear very simple as only the worn blocks need to be changed.



DIFFERENT TYPES OF SINGLE AND DUAL TIRES FOR COMMERCIAL TRUCKS

FIG. 14—THE GOODRICH WIRELESS SINGLE TIRE. FIG. 15—DIAMOND SIDE-WIRE SINGLE TIRE. FIG. 16—THE DIAMOND SIDE-WIRE AS A DOUBLE TIRE. FIG. 17—THE FIRESTONE CROSS-WIRE TIRE SHOWING THE DUAL DEMOUNTABLE FEATURE. FIG. 18—SWINEHART CROSS-WIRE SINGLE TIRE. FIG. 19—SINGLE REPUBLIC TIRE OF THE CROSS-WIRE DEMOUNTABLE TYPE. FIG. 20—SWINEHART DUAL DEMOUNTABLE CROSS-WIRE TIRE. FIG. 21—REPUBLIC DUAL DEMOUNTABLE WITH CROSS WIRES IN A HARD RUBBER CORE. FIG. 22—THE MORGAN & WRIGHT SIDE-WIRE TIRE HAS CROSS WIRES

Ignition Equipment To Be Seen at Chicago

More Suitable Materials and Compactness of Design Constitute the Improvements in Igniters and Coils, and Spark Plugs Are More Substantially Designed and Scientifically Constructed

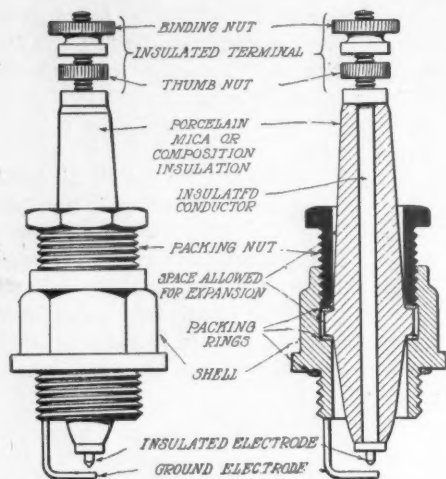


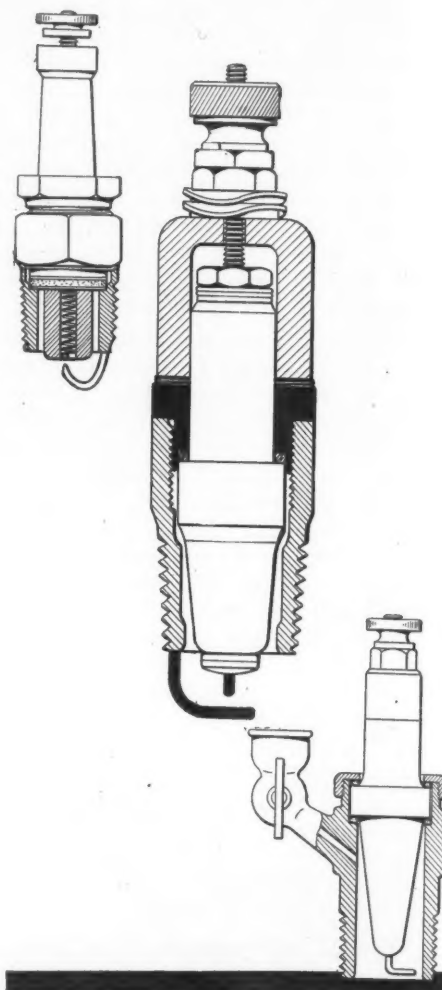
FIG. 1—SPARK PLUG FEATURES

ALTHOUGH the greatest progress in the ignition field this year is to be found in the birth of new magnetos, most of which are of a truly high-tension type, other ignition devices, including ignitors of the Atwater Kent, B & S and Delco systems, spark plugs, coils, switches, batteries and wiring connections, have come in for no small share of attention, as is indicated by the improvements that they present. In the way of igniters and coils, the improvements are confined chiefly to the use of more suitable materials entering into their construction and more compactness of design; spark plugs have been made more substantial by arranging and designing their various features with more respect to the relative variations in temperature; and switch and wiring connections are simplified and of more ingenious design.

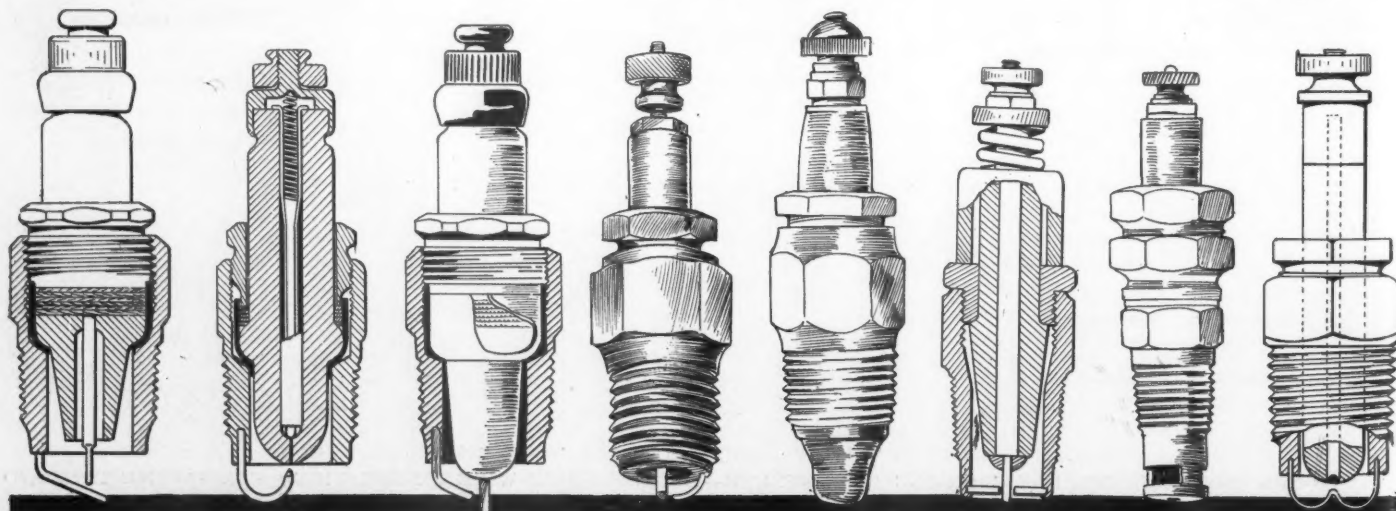
Space will not permit of a description of all the different devices in the above mentioned category, and as pictures are generally more intelligible than words, the story is told largely by the illustrations shown herewith.

There are many spark plug designs, but as all are based on the same fundamental principles and have the same characteristic features, it is but necessary to be familiar with these to appreciate, to a certain degree, the advantages of the various designs. The principle of the spark plug is to provide a means of holding two points of metal at a fixed distance apart in the combustion chamber of a motor, which metal points are so connected into the electric circuit that the induced current must jump from one to the other in order to complete its circuit. Both the secondary and primary currents of a jump spark system may make use of the metal of the engine as a ground return, and one of the points of the spark plug is therefore in contact with the metal of the engine, being either a part of or supported by the metal shell of the plug that is screwed into the cylinder.

The other point, of course, must be thoroughly insulated from it so that the current cannot complete its circuit elsewhere but across the space between the two points. These features are shown in Fig. 1. The features of a spark plug generally are subject to intense heat and as part of the plug extends into the combustion chamber of the cylinder, and the other part disposed on the outside of the motor. One end of the plug is subject to considerably more heat than the other, and a consequent inequality of expansion is the result. Therefore it is necessary that the design of a spark plug be such that unequal expansion can occur, otherwise great pressure would be brought to bear upon points of the insulation which would tend to destroy it. Another fact



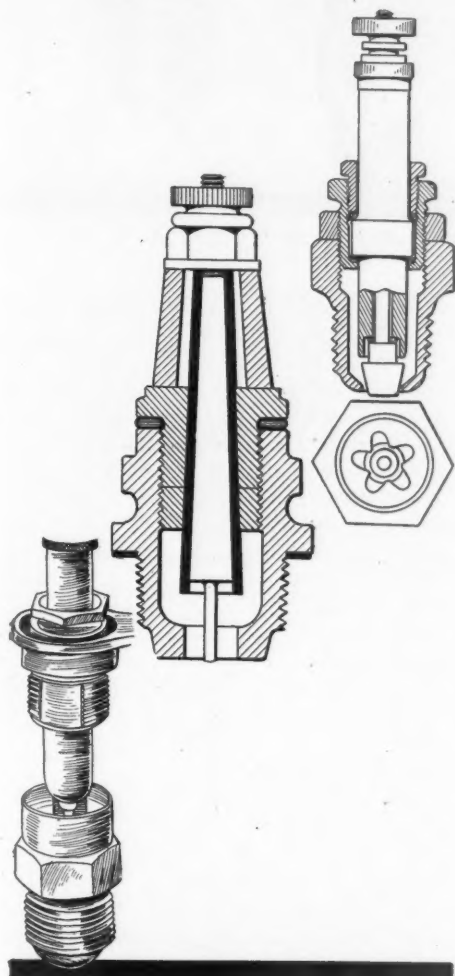
VANGUARD SPARK PLUG DESIGN
THE STA-RITE PLUG
ALL-IN-ONE PLUG



THE NAMES OF THESE PLUGS, READING FROM LEFT TO RIGHT, ARE: J-D PETTICOAT, RELIANCE, J-D CONICAL, GOTHAM, SHARP SPARK, K-W, SPIT FIRE AND SPARK-HEAT

Exhibition Shows Improved New Features

Batteries Are Better Adapted to the Conditions Under Which They Must Operate—And Switch and Wiring Connections Are Greatly Simplified and of a More Ingenious Design

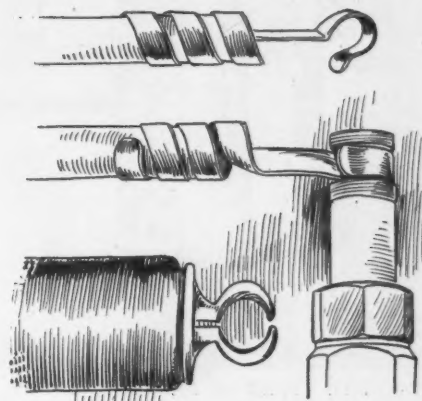


THE WICO SPARK PLUG
SPLITDORF SPARK PLUG
BREECH BLOCK PLUG

that must be borne in mind in spark plug construction is that various articles will expand more at certain temperatures than others and provision must be made for these variations of expansion.

A resume of the various spark plug constructions shown herewith brings out the fact that they all possess characteristics by which they may be classed as: single, double or multi-spark path types; inclosed or open types; porcelain, mica, or composition insulated types; and special types. The Champion, Red Head, Never Miss, Sootproof, Van Guard, Everyready Ajax, J-D conical, Kingston and Rajah plugs all are of the single spark path type; that is, there is but one path for the spark from a point of the insulated electrode to the ground portion of the plug. The new Hagstrom plug with its two ground electrodes is a representative of the double spark path type, and in the multi-spark path class may be found the Spit-fire, Eveready Meteor, Best, J-D closed end, Wico, Monarch magneto, Ball multi-spark, National, Eisemann, K-W, Heinze and Bosch. The advantage claimed for the multi-spark plug is that as more than one passage is provided there are fewer chances of burning and destroying the sparking points or electrodes.

The difference between the closed and open end plugs can readily be seen, for the inclosed end plugs like the National, Best and Spit-fire have constricted or almost closed sparking ends; while others such as the Rajah, Red Head, Kingston and Heinze have wide open ends. By closing or constricting the sparking ends of the



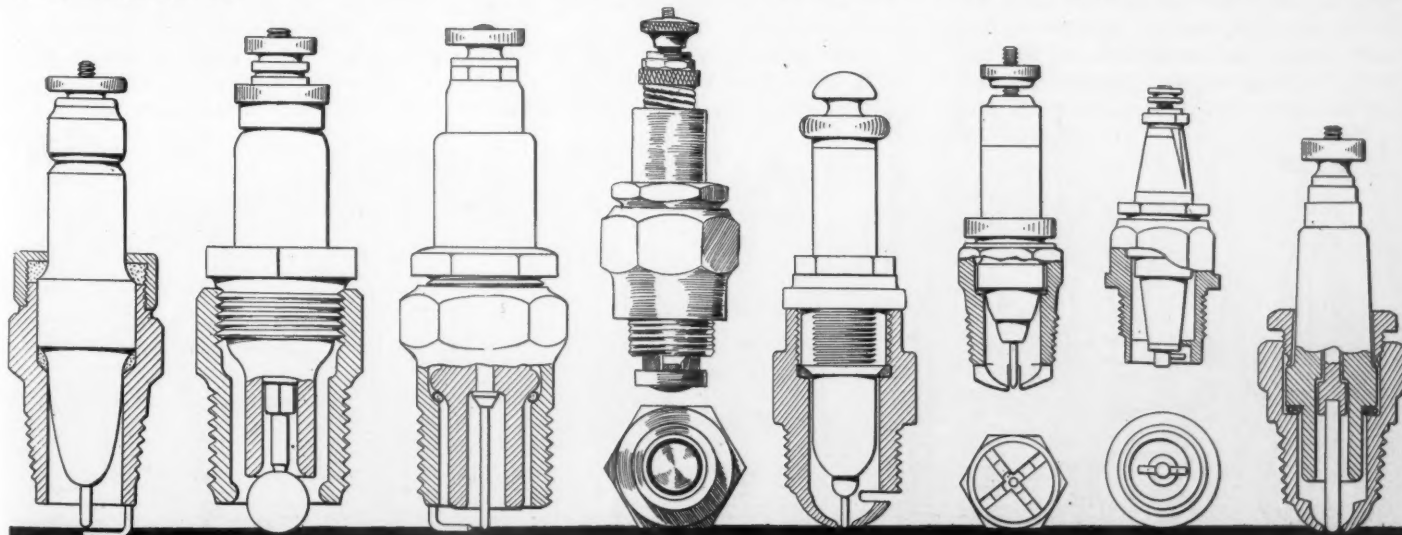
MOSLER AND CHAMPION TERMINALS

plug, makers of these types claim that durability is obtained because the insulation is shielded from the explosion pressures in the cylinder of the motor; and by constricting the passages near the sparking points the gaseous currents that continually rush back and forth past the sparking points are concentrated so that their force provides a sort of a self cleaning feature.

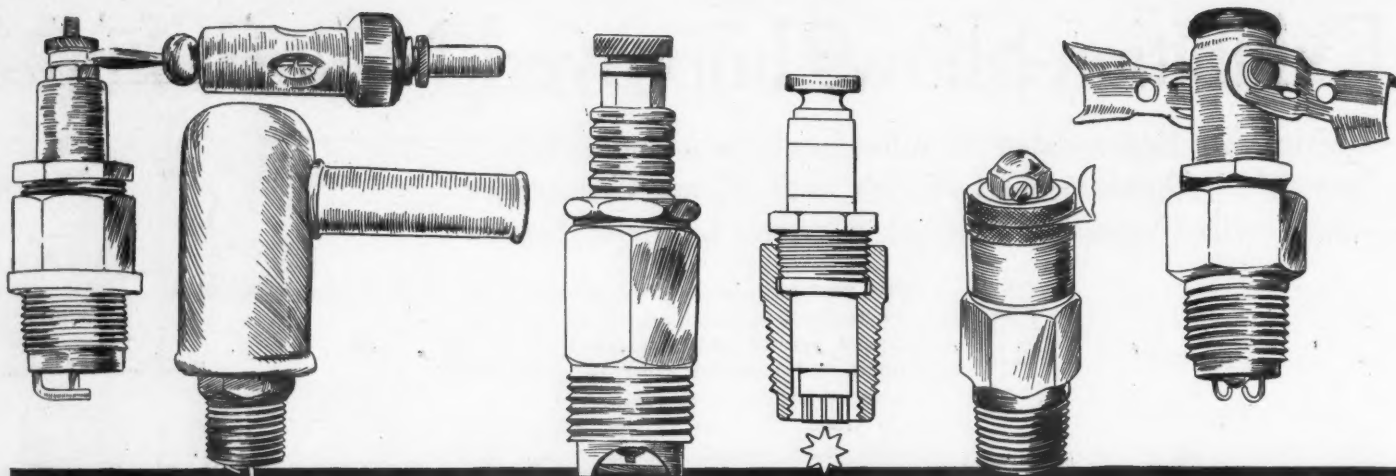
As for insulations it might be safe to state that porcelain and other earthen compositions are by far the most popular, and to be found in perhaps 85 per cent of the plugs now in use on the motor car. The remaining 15 per cent of the number of plugs in use have mica insulations.

Atwater Kent Offerings

The Atwater Kent Mfg. Works' line of ignition equipment includes a new high-tension distributor and a new coil for the dash with an improved design of kick switch mounted upon it. This line comprises the unisparker and the spark generator, together with the latest type of Atwater Kent ignition equipment including a new outfit in which the switch



MORE PLUG DESIGNS, THE NAMES OF WHICH, FROM LEFT TO RIGHT, ARE: MONARCH, BALL MULTI-SPARK, MEZGER, BEST, SPIT FIRE CIRCULAR, NATIONAL, ECCENTRIC AND WICO



UNUSUAL TYPES OF SPARK PLUGS OBTAINABLE, FROM LEFT TO RIGHT: CHAMPION WITH SPARK GAP CONNECTION, STA-RITE MARINE TYPE, HEINZE, ALBRIGHT, HERZ, EDISON DOUBLE SYSTEM

only is mounted on the dash. This switch is of substantial construction, and may be almost entirely disassembled by hand, there being no screws to come loose. The plain dash form of the Atwater Kent uni-sparker system has been devised to meet the prevailing style of simplicity and absence of parts on the dash. It consists of the same transformer, condenser and uni-sparker that are used in the standard system, but there are two features which distinguish this system from the other. These are the removal of the coil from the dash and the development of the new kick switch above mentioned. The stopping of the switch at different positions is made positive by steel balls which drop into sockets at each point. The switch arm operates smoothly and cannot stick or wear loose in service.

Ever Ready Batteries

Among the appliances manufactured by the American Ever Ready Co. this year are to be found the Ever Ready dry battery for ignition, Bulldog battery connectors, Every Ready flashlights, quick-detachable terminal kick switches, service switches, lever switches and pocket meters. The new quick-detachable terminals are such that no verdigris or foreign matter can accumulate on the contact; and they may be instantly detached and attached to any form of spark plug



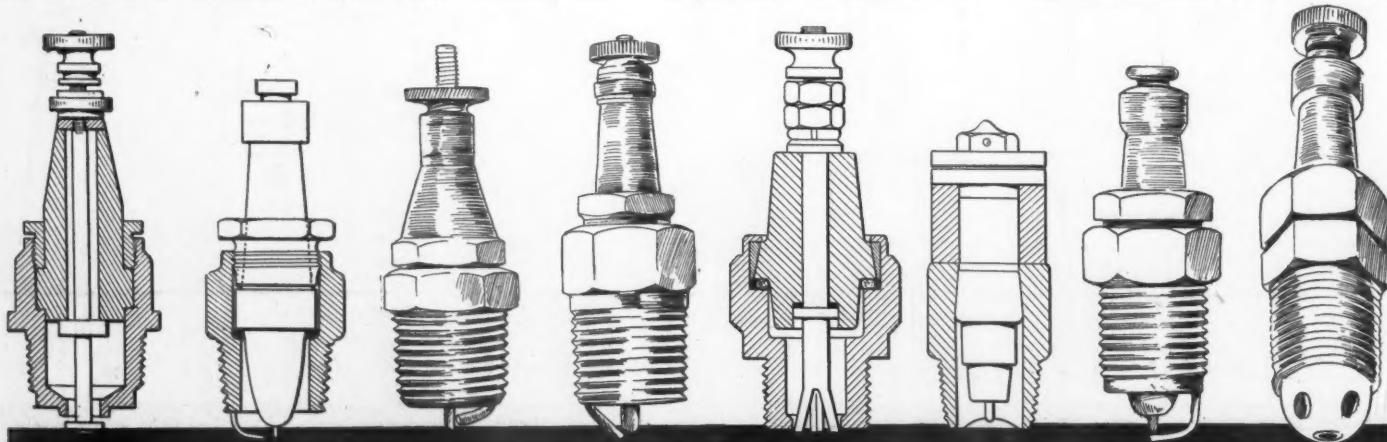
VESTA'S BATTERY-CHARGING BOARD
THE J-D RELIANCE SPARK PLUG CASE

or other electrical device. The new kick switch is of substantial construction with a safety lock. The plug may be removed

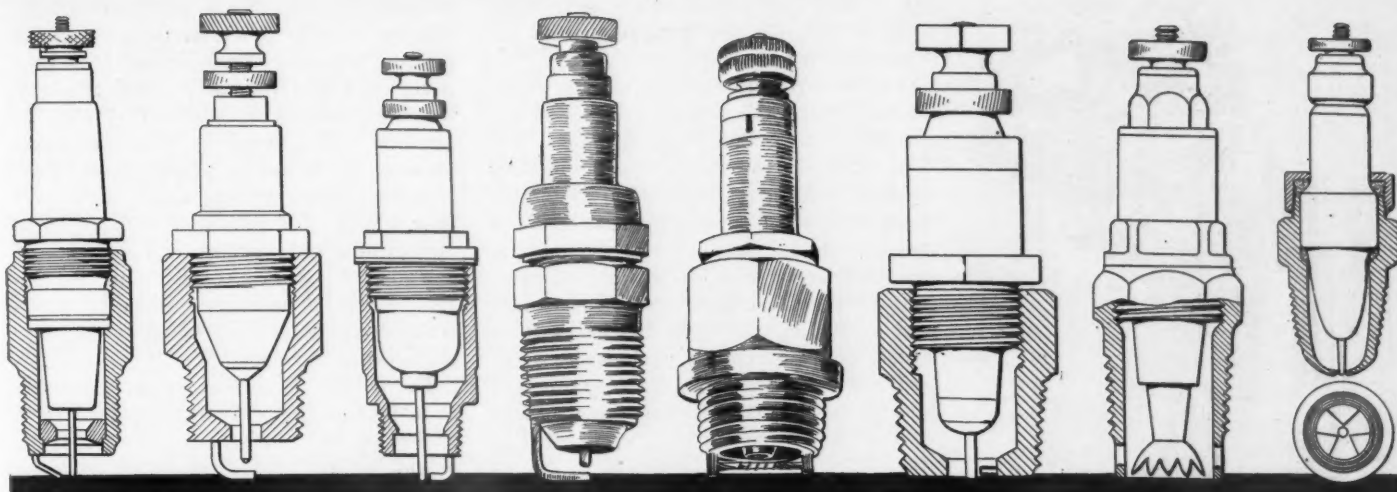
and the switch locked by a shutter sliding over the plug aperture, so it is impossible to operate the switch when locked. The electric service switch also is equipped with a safety lock and its superiority lies in its excellent construction and the material of which it is built. It is practically fool-proof. The new switch lever enables the operator to switch from one set of batteries to the other or to draw current from both sets of batteries at the same time, or the current may be cut off from both batteries and the contact knob remain attached to the lever or removed as desired. The new pocket readers are known as Ever Ready midget readers because of their being but $1\frac{1}{4}$ inches in diameter.

B & S Igniter Features

The B & S igniter is the feature of the Briggs & Stratton Co.'s line for the coming season. The B & S igniter is a combination in a single unit of a spark coil with high and low-tension windings, a distributor and a contact-maker, all of which are contained in a heat and moisture-proof metal case $3\frac{1}{2}$ inches in diameter and 5 inches long. A single non-vibrating coil is used for any number of cylinders. There are no vibrators, the circuit being closed and broken by a mechanical device which at certain speeds is assisted by the magnetism of the spark coil. The contact-maker provides a fixed



A FEW MORE OF THE SPARK PLUG DESIGNS, LEFT TO RIGHT: CIRCLE FIRE, RAJAH, KINGSTON, RED HEAD, NEW BOSCH, MERCEDES, EVEREADY AJAX, EVEREADY METEOR



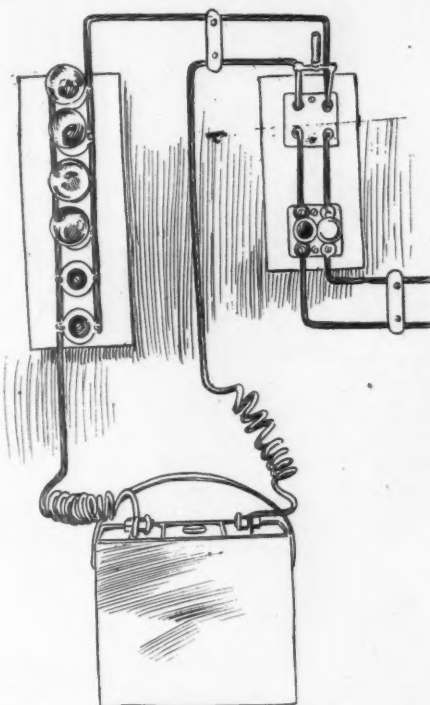
A FEW MORE SPARK PLUGS ON THE MARKET FOR 1911, FROM LEFT TO RIGHT: HAGSTROM, AMERICAN, SOOTLESS, NEVER-MISS, EISEMANN, COMET, MONARCH MAGNETO, MONARCH

period of contact, it is claimed, regardless of the motor speed. Three types of switches are furnished, one providing for two sets of batteries, one for a battery and open-circuit type of magneto and one for a battery inclosed-circuit type of magneto.

Bests's Plugs and Batteries

The Best spark plugs and ignition and lighting storage batteries are the features of the Best Ignition Equipment Co.'s line for the coming season. In the Best spark plug no adjustment of the electrode is necessary; there are no wires to run off or melt, the insulation extends all the way to the sparking surfaces, it is adapted to high-tension magneto work as well as battery ignition, the spark is produced at different points of the button head at different times, insuring long life to the electrode, the porcelain is protected against the shock of the explosion and means are provided that allow for the expansion and contraction of the electrode without causing pressure upon the porcelain, thereby preventing it from breaking.

In the Auto batteries manufactured by this company the plates are of the Faure or pasted type and the grids are of staggered construction, and it is claimed that the grid is so designed that it has the greatest strength with the least amount of dead lead and at the same time no par-



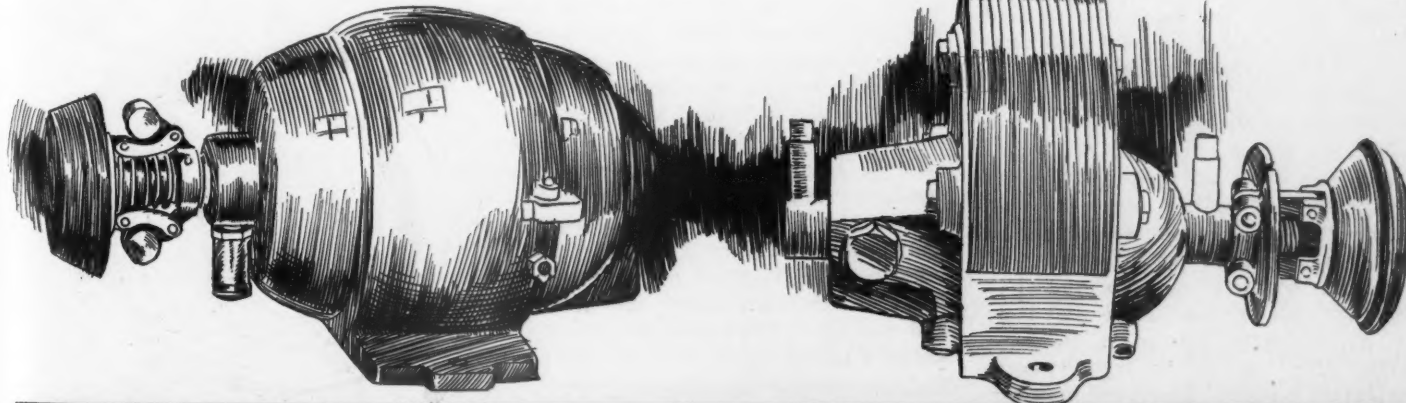
NATIONAL BATTERY CHARGING OUTFIT

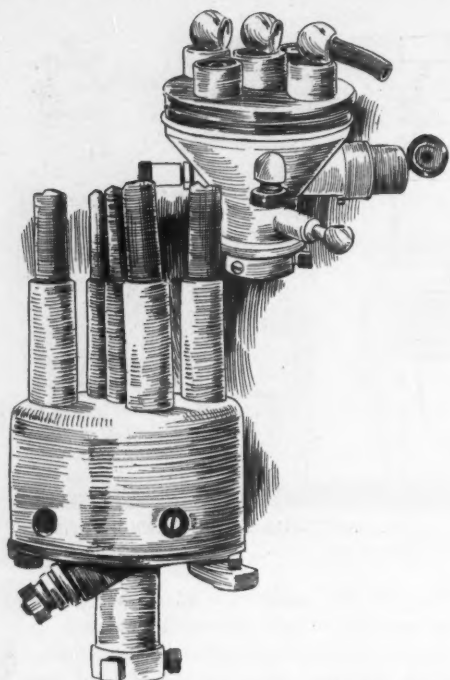
ticle of the active mass is far from the conducting frame. The separators are of ribbed wood, insuring good insulation, at the same time offering the least resistance to the free circulation of the electrolyte.

The jars are made of hard rubber having $\frac{1}{8}$ -inch reinforced walls and each cell has an independent hard rubber cover through which the connecting posts and bent tube pass.

Monarch Plugs and Timers

Monarch spark plugs and timers comprise the E. M. Benford line for 1911. The feature of this line is the Monarch magneto plug which has an insulating core almost twice the thickness of an ordinary mica plug. The sparking end is cup-shaped which throws the oil back and keeps it from going inside the plug chamber so that the formation of carbon around the mica insulation and consequent short-circuiting of the plug is prevented. The company still manufactures its porcelain insulated plug and also is putting out a special small timer which is guaranteed against wear for 3 years. The Monarch timer is of a well known design, its construction is very simple and the working parts may be easily removed and cleaned. The body is a solid piece of special fiber which will not deteriorate or lose its shape and is incased in a die-cast metal shell which is nickel-plated. A long shaft bearing is provided fitted with a nickel bronze bushing which supports the revolving roller contact member. The roller and contacts are made from a high





NEW HERZ TIMER AND DISTRIBUTOR
ATWATER KENT TIMER-DISTRIBUTOR

grade of steel capable of withstanding considerable wear.

Among the ignition devices manufactured by the Champion Ignition Co. a new spark plug is featured together with magnetos and other ignition devices. The spark plug is one in which the floating porcelain is guaranteed not to break, this feature being brought about by means of a new design of copper gasket and porcelain construction. The magneto is also a new construction and it has a low-tension type of armature with a high-tension winding between the magnets.

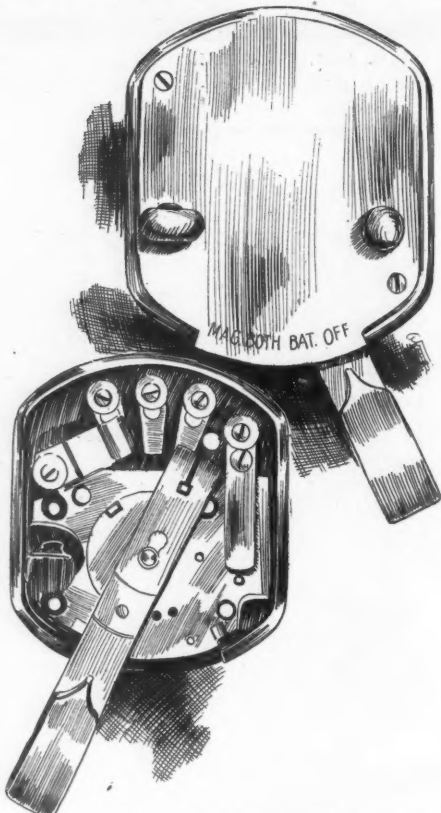
Eisemann Has New Plug

In addition to its full line of magnetos the Eisemann Magneto Co. has a new spark plug known as the Eisemann platinum spiral spark plug. This plug is of peculiar design, is made of the finest material and is finished according to Eisemann ideas. There are three places on this plug where the spark can jump so that if one or two are clogged there still is a third path for the spark to fire the charge. The points are made from platinum, which is claimed to neither burn nor rust, and the ground electrode is formed of a platinum wire wrapped around a solidly fixed nickel bar which is fastened to the body of the plug at each end.

The Edison Storage Battery Co. now manufactures smaller cells which are practically duplicates of those used in the electric vehicle service and which are adapted for use in ignition systems of motor cars. As in the vehicle battery, the structural material used throughout is steel, affording the greatest possible rigidity and strength with a minimum of weight. The ignition battery set is assembled in a regular bent wood tray contained in a steel battery box ready to bolt on the running board of a motor car.

As in the case of the larger sizes these cells are entirely free from sulphation and disintegration of the plates.

The Electric Storage Battery Co. manufactures the Exide sparking batteries and complete outfits for charging them. The line comprises the Exide Duplex sparking battery which is made in two sizes and the Exide emergency sparking battery made in two sizes, a charging board in which lamps are used in resistance and another charging outfit having a rheostat for the resistance and including a voltmeter and a hydrometer syringe and acid-testing outfit and the Ironclad Exide battery brought out for the first time by this company this year. This new battery is a development of



NEW ATWATER KENT KICK SWITCH
INSIDE OF ATWATER KENT SWITCH

the French invention purchased by the company about 4 years ago.

The positive plate is so designed as to prevent the loss of active material; it consists of a metal conducting top and bottom bar connected by vertical rods. Each rod is surrounded by active material which in turn is protected and held in place by a slotted hard rubber tube. Each tube has a vertical rib on each side which takes the place of the ordinary wood separators and makes the use of rubber separators unnecessary. A thin flat wood separator spaces the positive from the negative and the negative plate is a modified Exide negative plate thickened and improved. It is claimed that this battery will give two and one-half to three times the life of the ordinary battery.

Constant Current Generator

In addition to the regular line of non-sulphating storage batteries the Geiszler

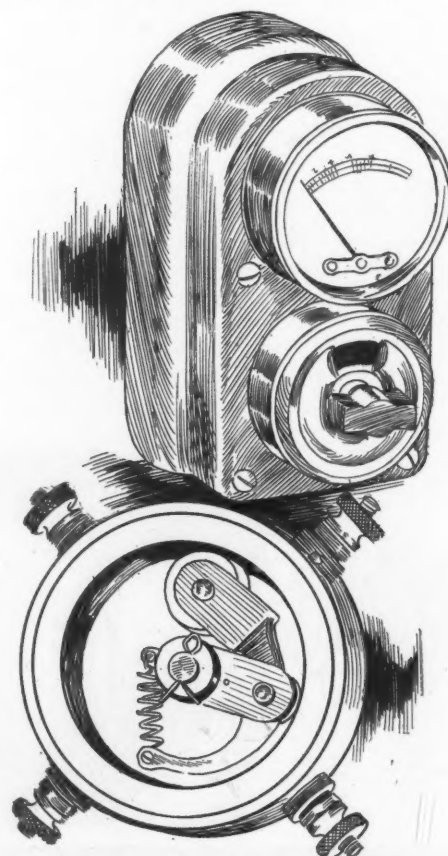
Storage Battery Co. is now marketing a constant current generator for ignition and lighting purposes. This generator has been designed with a view of insuring the automatic generation of constant voltage regardless of the speed at which the apparatus is driven and to permit of its operation by a fixed driving means such as a gear wheel. The generator in addition to maintaining the battery charge has been designed to supply more than current enough for 100 candlepower electric lamps while at the same time being able to supply ignition current.

The Gilbert Mfg. Co. makes two styles of leather magneto covers, one of which is of heavy sole leather and the other of patent leather. These covers are made up in any style to fit any type of ignition device.

In addition to the several designs of both mica and porcelain insulated spark plugs bearing the name of Sta-Rite, the R. E. Hardy Co. has brought out a new Vulcan type having a double porcelain insulation. The chief difference between the new Vulcan plug and the other types made by this company lies in the fact that the otherwise exposed portion of the porcelain insulation is covered by a porcelain cap as illustrated. With the double porcelain it is claimed the contraction and expansion of the plug is uniform and the cap protects the inner heated tube so that the possibilities of breakage or leakage are considerably reduced.

Has Non-Conductive Porcelain Guard

Among the motor car accessories and electrical specialties made by the Hag-



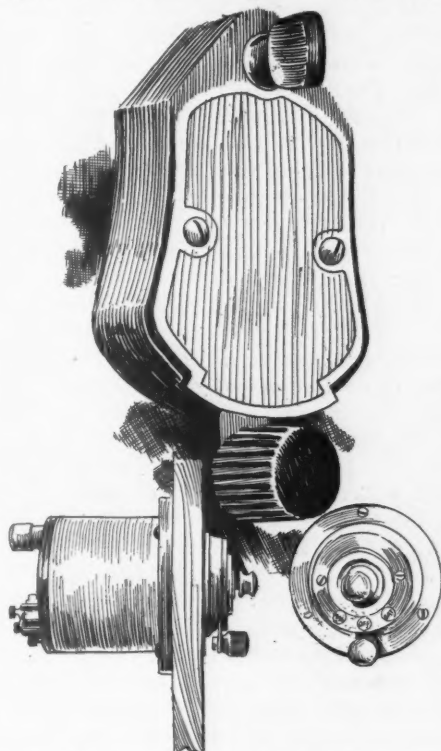
APPLE SWITCH AND INDICATOR
PITTSFIELD TYPE C TIMER

strom Brothers Mfg. Co. a new spark plug is shown. The feature of this plug wherein it differs from other plugs on the market is the non-conductive porcelain guard at the bottom which keeps soot and oil from entering the body of the plug. The electrode points are designed to be kept clean by the blast of the internal cavity when pressure is released by the exhaust. The gasket is made of copper, which allows for expansion and contraction due to the varying temperatures so that the chances of cracked porcelains are considerably reduced and the plug leak-proof.

Another feature to which attention is called in this plug is that of the lock washer design which prevents the center electrode from being turned when a thumb nut at the top is tightened on the wire terminals. Thus the distance between the two sparking points remains in proper adjustment at all times. This company also makes a very handy wrench for removing spark plugs from cylinders and for holding them when taking them apart for cleaning purposes.

The Heinze Electric Co. manufactures a very complete line of ignition appliances, including dash coils, round magneto coils for under the hood, marine coils, timers, spark plugs and switches. The Heinze coils are of superior design and finish and of durable construction. The timers are the result of a large amount of experimenting with various forms of contacts

and contacting metals and are of the white contact design with hardened steel and phosphor bronze springs as proving the best for wear, accuracy of make and general reliability. The case of the timer is made of compressed fiber and the cover of aluminum lined with fiber. The bearings are of composition having a hardened and ground steel shaft rotating within which is attached to the camshaft of the engine. The timer is $2\frac{1}{2}$ inches in diameter and $2\frac{3}{4}$ inches long. Heinze switches are of the rosette design about $3\frac{3}{8}$ inches in diameter and are made of hard rubber composition. They are designed to operate two sets of batteries independently, but can be used to connect both sets in multiple. The Heinze magneto featured by



NEW PITTSFIELD KICK SWITCH
THE HEINZE PORCELAIN DASH COIL

this company is a low-tension apparatus using a transformer coil.

Jeffery-Dewitt Plugs

The Jeffery-Dewitt Co. manufactures a full line of spark plugs including the Reliance plug, which is made in several designs adaptable to all types of motors and with both porcelain and mica insulations, the Edison double system plug which is practically two plugs in one and three types of J-D plugs made in all standard sizes. In the Reliance plugs the mechanical details have been given the most careful attention, the metal parts being carefully machined. The bushing or packing nut is case-hardened to insure long life and prevent bruising and forcing out of shape by a wrench.

The terminal cap is of solid stock securely crimped on the head of the porcelain and entirely independent of the central electrode making it impossible to disarrange or destroy the plug by screwing the binding nut too tightly. The Edi-



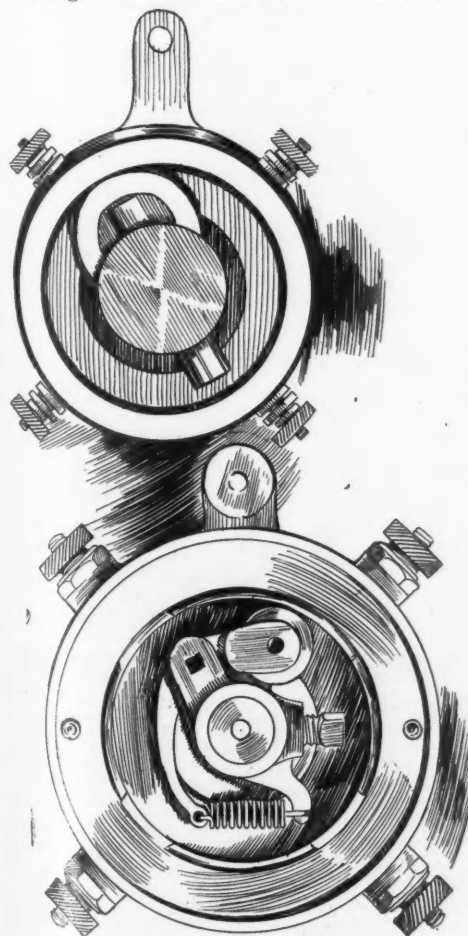
THE B. & S. IGNITER AND DISTRIBUTER
THE DELCO TIMER-DISTRIBUTER UNIT

son double system plug is a decided innovation, being designed to meet the requirements of those who desire to equip their motors with a double system of ignition, though having provision for only one spark plug in each cylinder. Though no larger than a single plug, it has two separate and distinct insulated poles.

In addition to the new model J high-tension magneto recently brought out by the K-W Ignition Co. this firm manufactures a complete line of high-tension magnetos for all types of motors regardless of the cycle or number of cylinders, a special spark plug especially adapted to K-W ignition equipment, induction coils of a non-vibrating, vibrating or master vibrating type which are also designed for all motor types, and low-tension generators for both ignition and lighting purposes. The high-tension magneto just brought out is guaranteed to start any motor up to 30 horsepower on the quarter turn of the crank. The spark which it produces is blood red in color and is a pure dynamic spark of intense heat value which gives quick and snappy ignition with consequent great power and motor efficiency. It is claimed that with this magneto there is no need whatever of any battery equipment.

Has a New System

The J. H. Lehman Mfg. Co. has brought out the new and unique L-H-L ignition system by means of which a simple combination of high frequency and low-tension currents, a low-tension jump spark is obtained which heretofore has been regarded as an impossibility. The essential features of the L-H-L system are a source of primary current which may be magneto generator or batteries and a disruptive dis-



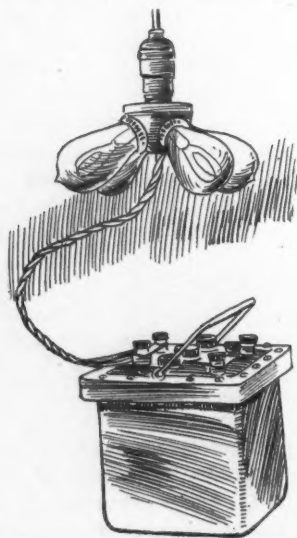
THE MOSLER UMPH TIMER
THE BENFORD CO'S MONARCH TIMER

charge coil condenser and distributor. All are arranged in a compact manner. A portion of the primary is converted into high frequency by the coil which contains but a very few turns of coarse wire and no iron core, and another portion is shunted around the coil and combined with the high frequency to perform joint service at the plug. The high frequency bridges the gap with an unfailing spark, but practically no heat; while the low-tension is carried with the high frequency and flares into an intensely hot spark with heat enough to readily set cardboard ablaze. In the intensity of its heat and positiveness of its action the L-H-L spark is claimed to be superior to that produced by a make-and-break mechanism and is without the mechanical drawbacks characteristic of this type of ignition system.

Spit Fire Spark Plugs

A full line of Spit Fire spark plugs of the regular and breech block designs comprise the line of A. R. Mosler & Co. Spit Fire plugs are made in all standard sizes and designs and special types or sizes are made to fit any engine or any tread. The line includes special Vesuvius magneto plugs with glazed stone insulation, mica plugs, special magneto plugs with extra heavy iridium points, Vesuvius magneto plugs and a new Vesuvius racing type of plug. In addition to this line of spark plugs the line also includes waterproof plugs which have a hood of heavy porcelain which may be easily removed and is securely held by a spring socket. This is comprised of a porcelain hood screwed on to the cable which expands the cable and makes a hermetically sealed connection.

The leather spark plug case furnished by this company forms a positive and reliable method for carrying spark plugs safely under the most trying conditions. Mica cores made to fit Spit Fire plugs are interchangeable with the porcelains or the glazed lava stone insulators and features of Spit Fire plug construction are the use of good design, good materials and workmanship, durability and high efficiency. In addition to these the Mosler company man-



WITHERBEE CHARGING OUTFIT

ufactures special connectors, timers, distributors and control levers.

Offerings of Motsinger

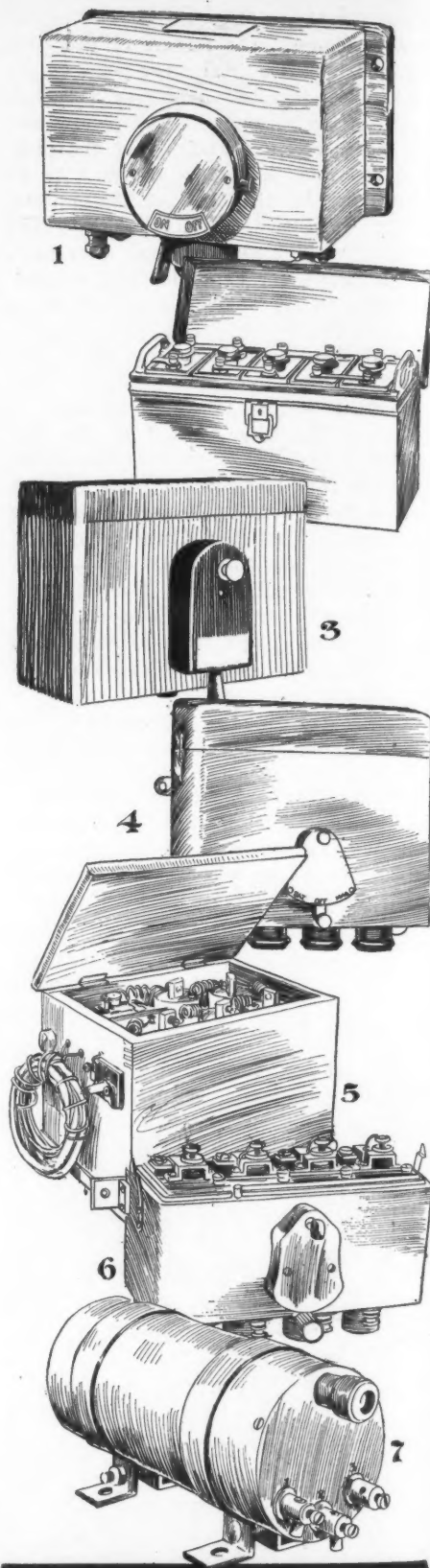
The features of the Motsinger line are an auto-sparker, a direct current magneto, a small compact charging switchboard and a Faultless plug switch, all of which bear the name of Motsinger, their maker. The Motsinger outfit is a simple apparatus by means of which the storage battery may be charged at the same time it is discharged. The current is supplied by the auto-sparker which is a small direct current dynamo and the charging current is regulated by means of a small charging board and switch included in the system.

The National Battery Co. has brought out in addition to its large vehicle batteries a small storage battery for motor car ignition and lighting purposes. These are made in various sizes and capacities of ranging from one to five cells and from 2 to 10 volts. In addition to these batteries this company is also manufacturing fixtures for charging from a lamp circuit and various battery accessories including wood cases, rubber covers for cases, acid-proof handles, positive plates, negative plates, rubber separators, rubber vents, lead-covered bolt connectors, rubber extensions for vents, sealing compound, electrolyte and hydrometer sets. The lead-covered bolt connectors recently brought out by this company are a commendable feature of the National batteries in that they permit of connecting or disconnecting the cells without the necessity of fusing the connections together.

In addition to the new magneto recently brought out by the National Coil Co. this company's line includes a complete array of vibrating sparking dash coils with interchangeable units, special waterproof marine coils, a unique battery box outfit, primary coils of the Edison, switch plugs of simple design and a spark plug design with four sparking points on the ground electrode which can be easily taken apart and cleaned and which it is claimed will not foul or sit up sufficiently to cause a short-circuit. The National ignition devices are made for all types of motors.

Columbia Multiple Batteries

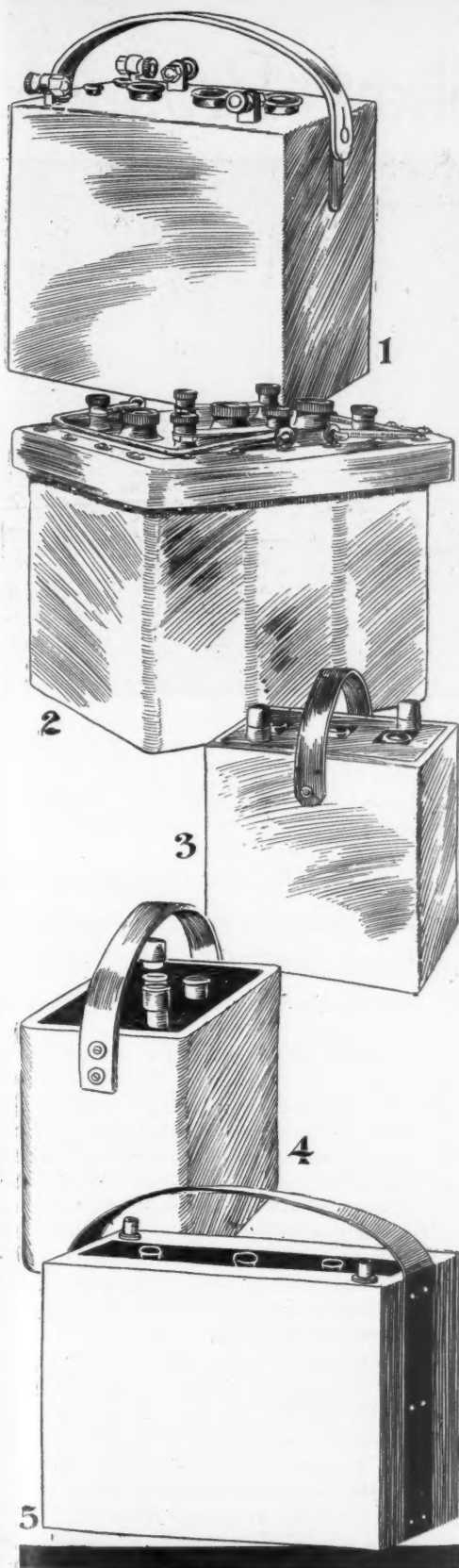
A complete line of Columbia multiple dry batteries for high grade ignition work is manufactured by the National Carbon Co. These batteries are claimed to be waterproof and of substantial construction. An interesting feature of these batteries which is to be of particular value to tourists is the warning they give when approaching exhaustion. After continued use the battery weakens to the point where a little sluggishness in the motor is noticeable. This sluggishness is not enough to affect the successful running of the car, but it is claimed by the manufacturers that when this point is reached one may safely count on from 100 to 150 miles more of service before the battery is exhausted to a point where it must be discarded. This is intended to provide a factor of safety which would prove a



1—NEW ATWATER KENT COIL, 2—EDISON IGNITION BATTERY, 3—DELCO DASH COIL, 4—K-W SPARK COIL, 5—NATIONAL DRY CELL CASE, 6—PITTSFIELD VIBRATING COIL, 7—A HEINZE COIL

great deal of comfort to car owners using dry cells in their ignition system.

Several new models have been added to the vibrating line of spark coils manufactured by the New York Coil Co., so that their equipment now comprises a variety



1—THE EXIDE SPARKING BATTERY, 2—WITHERBEE STORAGE BATTERY, 3—THE DAYTON STORAGE UNIT BATTERY, 4—THE AUTO BATTERY, 5—HEISSLER STORAGE BATTERY DESIGN

of ignition coils, lock switches and vibrators, motor cycle coils and coils for special uses such as laboratory work and wireless telegraphy. A feature of this company's equipment is the Rhoades unit spark system. This system provides the jump spark

ignition with batteries for source of current. The patented circuit-breaking mechanism which determines the time of spark production and a specially-built non-vibrating coil comprise the two working parts of the system, dispensing entirely with the use of the timer, vibrating coil, complicated wiring and the annoyances occasioned by faulty vibrator adjustment, etc. This company's combined timer and distributor is also a feature worthy of attention.

Willard Shows Improvements

The Willard Storage Battery Co. has made a number of improvements in its equipment for the coming season and special attention has been given to the design of suitable switches, sockets, protecting boxes for wire connections, etc., and these form an important part of their equipment. In addition to these and the well-known Willard storage batteries a new type of battery is now included in the line which is designed to meet the demand of owners for a battery which can be placed in some location other than on the running board. The Elba electric lighting system also is a feature. One notable advance made by the Willard Storage Battery Co. has been the development of a complete line of insulation fittings. These consist of suitable outlet boxes for protecting wiring joints, a fuse box for preventing possible injury to the battery in case of short circuit, and special cable and other details which make for perfection of a complete system of sufficiently substantial construction to withstand the severe conditions of motor car service.

What Splitdorf Offers

A full line of magnetos, coils, spark plugs, switches and timers is manufactured by C. F. Splitdorf. The Splitdorf Common Sense plug is specially adapted to Splitdorf ignition equipment and is claimed to be made of the best materials and supplied in all sizes and threads. It is a solid, compact construction with a mica insulation and especially adapted to the intense heat of the magneto spark. Splitdorf coils are of the unit non-vibrating and master-vibrating type designed to be fitted in the ordinary type of wooden dash coil box or in a tubular form adapted to be attached under the hood or otherwise located in an obscure position. The switch is a simple, effective design with a neat hard rubber case.

The Vesta Accumulator Co. manufactures ignition batteries, switches, metal battery boxes, electrical fittings of many varieties, a mechanical electric generator for keeping batteries charged and two types of charging outfits—one a simple cluster lamp resistance for charging from a 110-volt circuit and the other especially adapted charging board containing a rheostat and an ammeter. The standard 60-ampere-hour sparking batteries are made for a 4, 6 or 8-volt pressure. The standard 6-volt 60-ampere-hour battery is the size that is universally used in the motor car



HAGSTROM HAND VICE
GILBERT MAGNETO COVER

and it is claimed that this size battery will run the average four-cylinder car under ordinary conditions from 800 to 1,000 miles on a single charge. In this type of battery solidified sulphuric acid is used, it being about the same consistency as ordinary table jelly.

Oil Tanks for Magnetos

Two new features of the Briggs Mfg. Co.'s line for the coming season are the use of oil tanks adapted to be placed in the arch of the magnetos which hold enough oil to keep the magneto thoroughly lubricated for an entire season, the oil being fed to the bearings by means of wicks; and a new centrifugal governor for automatic control of magneto ignition. Besides the high-tension magneto made by this concern its line includes other ignition specialties such as coils, timers and switches.

The new features of the Kokomo Electric Co.'s line this year are a new low-tension magneto with an auxiliary coil for the production of high-tension current and a new Kingston kick switch.



VESTA'S RHEOSTAT CHARGING BOARD

First Week of Chicago Show Produces



CADILLAC DINNER DURING COLISEUM SHOW

AS SHOWING THE VAST TERRITORY COVERED BY THE NATIONAL EXHIBITION, THERE WERE PRESENT DEALERS FROM FAR-OFF STATES. IN THE ILLUSTRATION THE FOLLOWING ARE NOTED: 1—H. M. LELAND; 2—W. C. LELAND; 3—E. R. BENSON; 4—I. M. UPPERCU; 5—C. H. FOSTER; 6—GEORGE BLACKSLIE; 7—D. LEE; 8—I. S. BARNETT; 9—R. R. HALL; 10—R. RHEIM; 11—R. W. COOK; 12—R. L. WENDELL; 13—L. E. HORTON; 14—CHARLES B. KANE; 15—G. W. SHROYER; 16—CLAUDE NOLAN; 17—K. DRYSDALE; 18—R. GREENLEASE. THE DEALERS LISTENED TO ILLUSTRATED TALKS ON THE CADILLAC

CHICAGO, Feb. 5—After the most successful run it ever has had in its 10 years of existence, the national pleasure car show, which was held in the Coliseum and First Regiment Armory last week, came to a close at 10:30 o'clock last night, and immediately there was an evacuation of the two big buildings in order that preparations for the commercial car week might go on. Never before was there so orderly an exodus, and a new record was established when the Coliseum was emptied of the pleasure cars in 1 hour 45 minutes, leaving the big building to the decorators, who at once started moving things about and recarpeting the floor for the business power wagons.

This quick move was due to system inaugurated by the management, which remembered the confusion of other years and took steps to prevent a repetition of it. Each exhibitor in the Coliseum was given a number and was told that he could not move a wheel until that number was called. To prevent any possible misunderstanding and to awe those who might try to put one over, policemen were scattered throughout the building and the presence of the blue-coats was sufficient to hold everyone in line until their turn came.

The Getaway

Early in the evening the Marmon people who were in the Coliseum annex and directly in the path to the door to the street through which the cars had to be exited, were allowed to remove their big collection of trophies and at 10:15 they were given permission to slip their cars through the door. This left a clear route for the others and at 10:30 promptly No. 1 was

As Usual Windy City Lives Up To Its Reputation of the Past, Attracting Agents From All Sections of the Country—Attendance Is Said to Have Been Better Than Last Year

called and that exhibit was quietly rolled out into the street. The others followed in order and at 12 o'clock all but two of the cars were out and those two were held only 15 minutes while waiting for an express wagon to cart them away. As soon as the last pleasure car had departed a gang of workmen got busy and before morning the entire main floor of the Coliseum had been recarpeted and the last vestige of the pleasure car show had disappeared.

The pleasure car makers took the show well satisfied with their week's showing, for undoubtedly the recent session produced more business in a wholesale way than ever before was reported in Chicago. The show in this city always has been remarkable for the attendance of agents from all points of the compass, but this time there were more dealers here than even the management expected.

The dealers that came were not sight-seers by any means and many brought with them prospects who closed for their cars while in Chicago. Of course, most of the older makers already had closed for considerable of their territory and only had a few spots here and there to cover, but the makers of the new generation found Chicago a rich garden in which to plant their product. Deals were consummated here during the week that will result in the moving of many cars in the present season. Just how much business

was done will be hard to estimate, but it is extremely probable that the range of business ran all the way from ten to 150 cars.

In a retail way, perhaps, the Chicago show did not produce any very startling results, but just the same there hardly was a concern in either building which did not sell cars to the consumer. Probably no one sold more than ten or a dozen at retail among the higher priced makes, but the concerns handling low-priced goods found a most lively market.

Dinners of the Week

Dinners held during the week by several of the big companies showed most plainly the scope of the Chicago show and illustrated the distance many dealers traveled to get here. This is particularly noticeable at the love feast of the Cadillac agents at the Congress hotel Wednesday night when it was noted that there were dealers present from practically every section of the country. Among those from far off points were Don Lee of Los Angeles, Frank Covey of Portland, Ore., R. R. Hall of Denver, Colo., Robert Greenlease of Kansas City, R. Rheim of Omaha, H. H. Hestand of New Orleans, L. E. Horton of Minneapolis, R. E. Wendel of Cincinnati, Angus Jonas of Milwaukee, Claude Nolan of Jacksonville, W. H. Barger of Cleveland, Louis Lichtie of Toledo, I. M. Upperu of New York, Alfred Measure of Boston, George Blackslie of Jersey City,

Big Business For Pleasure Car Makers



HUDSON BREAKFAST DURING SHOW WEEK

AMONG THOSE WHO ATTENDED THE HUDSON SPREAD AT THE C. A. A. WERE THE FOLLOWING AGENTS: H. H. DILLON, HASTINGS, NEB.; C. O. FUNK, LARNED, KAN.; MILTON G. SMITH, SOUTH BEND, IND.; CHARLES J. DURHEIM, MUSKEGON, MICH.; C. F. JAMISON, LA FAYETTE, IND.; J. W. MORRIS, PONTIAC, ILL.; FRED P. NEUMEISTER, ROCKFORD, ILL.; W. S. YOUNG, LARNED, KAN.; WALTER J. BEMB, DETROIT, MICH.; N. C. OELKERS, DAVENPORT, IOWA; W. E. MOYER, DES MOINES, IOWA; H. C. LUCKETT, MEMPHIS, TENN.; EDWARD LA FOREST, INDIANAPOLIS, IND.; W. H. LUCIA, OCONTO, WIS.;

Getaway When the Exhibition Closes Is Most Remarkable, Coliseum Being Emptied of Every Passenger Vehicle in 1 Hour 45 Minutes—Concerns Give Dinners to Their Dealers

L. S. Barnett of Louisville, A. L. Gould of Mobile, Ala., Charles B. Kane of Buffalo, William G. McAlister of Pittsburg, R. W. Cook of Philadelphia, G. W. Shroyer of Dayton, O., Thomas Curtin of Columbus, and C. H. Foster of Chicago.

There were in attendance in all at this love feast 100 dealers, fifteen factory representatives and ten salesmen, and instead of listening to speeches and platitudes as to the condition of the industry the Cadillac men became more practical and educated themselves by listening to illustrated talks by the various executives of the factories on design, engineering, selling and advertising. One of the interesting features of the session was a talk by Henry M. Leland.

The Hudson Breakfast

The Hudson company departed from the conventional by holding a breakfast at the Chicago Athletic Association Thursday morning, which was attended by fifty representatives of agencies handling the Hudson. The Hudson dealers did not come from so great a distance as did the Cadillac dealers, but still there were present agents from Minneapolis, Pittsburg, and other large cities in this immediate vicinity.

The Thomas B. Jeffery Co. probably had fifty of its dealers in attendance at the show, and a fairly good representation, but one which would have been larger had it not been for the annual convention at

the Rambler plant about a month back, which brought together at that time all representatives of Rambler cars in the country. Still the Rambler record last week was a good one, for among those who traveled a great distance to get to the Chicago show were F. M. Atwood of Fort Worth, H. B. Ribbins of Charlotte, N. C., L. G. Martin of Pittsburg, Prince Wells of Louisville, and T. J. Downs of Minneapolis. The Moon company had representatives here from Portland, Ore., Mobile, Ala., Bismarck, N. Dak., Buffalo and Pittsburg.

About 150 of the central and western Cole selling agents were the guests of the Henderson Motor Sales Co. at a banquet given last Friday evening. Addresses were made by J. J. Cole, president of the Cole Motor Car Co.; C. P. Henderson, general sales manager of the Henderson Motor Sales Co.; A. W. Knoblock, general manager of the Northway Motor Mfg. Co., and Harry Lewis, of the Lewis Spring and Axle Co. The following Cole distributors spoke on sales conditions in their respective territory: William L. Colt, New York; C. Cole, San Francisco; H. S. Haynes, Minneapolis, and E. C. Frady, of Chicago.

BAY STATERS AT BANQUET

Boston, Mass., Feb. 8—The annual banquet at the Lenox tonight of the Bay State A. A. proved to be one of the best affairs ever conducted here in connection with

motoring. There were more than 200 guests seated at the tables in the banquet hall and at the right and left of President E. A. Gilmore were Governor Eugene Foss, Mayor John F. Fitzgerald of Boston, Colonel William D. Sohler of the Massachusetts highway commission, President Robert Hooper of the American Automobile Association, former President Lewis R. Speare of that organization, President John H. MacAlman of the Boston Automobile Dealers' Association and President C. F. Whitney of the Boston Commercial Vehicle Association. When the diners had finished eating President Gilmore first thanked the members for turning out so well and he then introduced Governor Foss.

Mayor Fitzgerald outlined the ideas he had formed which resulted in his sending to the legislature this year five different bills relating to the motor industry. He said that while some of the men affiliated with the industry might oppose the bills, yet he was working for the good of all the people. Colonel W. D. Sohler of the highway commission spoke on the various problems that arise in carrying out the motor law and asked the coöperation of the members in helping to maintain better conditions in operating machines, more particularly in the crowded cities. President Robert B. Hooper of the A. A. A. paid a tribute to Lewis R. Speare, and then on behalf of the A. A. A. he presented him with a solid gold stop watch bearing the A. A. A. monogram on the case, and inscribed inside, telling why it was given to Mr. Speare. Several others also addressed the banqueters.

Blizzard Fails To Keep Bisons Away

Crowds Turn Out on Opening Night of Buffalo Show Despite Adverse Weather Conditions—Arsenal Remarkable for Beauty of Its Decorations—Novel Floor Cleaning Scheme

BUFFALO, N. Y., Feb. 6—In a driving blizzard, the doors of the ninth annual show were opened and a crowd that broke all Buffalo show records poured into the arsenal tonight. From the moment Buffalo's mayor pressed the electric switch that released the bolts and signalled the orchestra to begin playing, until nearly midnight, a solid throng coursed into the big hall and crowded the aisles to a point where progress was difficult.

The composition of the crowd was similar to all motor show first nights. Thousands were there for amusement, but most of those who braved the stinging blizzard seemed to have more serious business on hand. The number of parties dressed in evening clothes was noteworthy and the exhibits of such companies as the Pierce-Arrow, Peerless, Packard, Thomas and other higher priced cars attracted the most careful attention.

Interior of Arsenal

The arsenal presented a most pleasing interior appearance. While the decorations were severely plain, they were effective to an astonishing degree. From the floor, clear to the dome, the walls and ceiling were smoothly covered with white cloth, thoroughly fireproofed. The effect lent itself to vastness and the continuous billow of white was unrelieved except for lines of brilliant lights, each blazing with the potency of 250 candlepower. In the center of the ceiling, the most gorgeous colored light effect ever seen in Buffalo, if not in the country, was produced through a combination of thousands of small bulbs entwined with flowers. The colors used ranged from deep yellow to soft pink and when the current was turned on, even the most blasé show-goer was forced to give the tribute of applause.

The exhibits consist of fifty-six booths in which are shown sixty different makes of cars, totalling 204 models, and a rather complete line of accessories of all sorts. The following different makes of cars are shown:

Denniston, Overland, Auburn, Atterbury truck, Cole, Case, Paige-Detroit, Warren-Detroit, Reo, Everitt, Packard, Winton, Babcock electric, Peerless, Haynes, Brunn electric, Franklin, Pullman, Chalmers, Hupmobile, Hupmobile electric, Cadillac, Pierce-Arrow, Thomas, Firestone-Columbus, Abbott-Detroit, Krit, Selden, Brush, Jackson, Oakland, Oldsmobile, Mitchell, Stoddard-Dayton, Stoddard 20, Velle, DeTamble, Inter-State, Stevens-Duryea, Pope-Hartford, Knox, Hudson, Ford, Detroit electric, Cartecar, Maxwell, Columbia, Sampson light delivery, Elmore, Locomobile, American trucks, Grabowsky, Alden Sampson trucks, Rapid, Lexington, Whiting, E-M-F, Flanders, Schacht, Rambler.

Among the accessory concerns are the following:

E. E. Denniston, tops. Jaynes Auto Supply Co., supplies, tires, etc. Kleinhans Co., cloth-

ing, supplies, etc. Centaur Motor Co., general accessories. Iroquois Rubber Co., tires and accessories. Charles E. Miller, general accessories. Frey Auto Supply Co., speedometers and general accessories. Polson Mfg. Co., windshields, tops and bumpers. Robertson-Cataract Co., electrical accessories. Brunn & Co., bodies, etc. Joseph B. Schmidt, Acherson graphite. Frontier Rubber Co., tires. Cataract Refining Co., lubricants. Wayne Oil Tank and Pump Co., pumps.

Layout of the Arsenal

The floor of the arsenal is divided into eight oblongs, separated by wide aisles, and around the walls on all four sides exhibits, mostly accessories, are arranged. No individual decoration was allowed save for parti-colored ribbons which were placed by some of the exhibitors to protect some especially delicate upholstery, and the whole impression created was of exceeding richness and elegant simplicity.

The show is being conducted by the Buffalo Automobile Trade Association, whose efforts are endorsed and supported by the Automobile Club of Buffalo. This is the second year in which the present management has undertaken the show and in point of public interest and completeness of exhibits it stands out distinctively in a class by itself.

History of the Show

The history of the Buffalo show covers 9 years. In the early days, back in 1903, a trade association decided to hold a show. It scored a success at the first effort and for four seasons the dealers conducted the annual display, each succeeding event going a step further in advance of the art and trade developed and spread out. But in 1907 the character of the annual display was greatly enhanced by virtue of the interest taken by the owners of cars and the Automobile Club of Buffalo assumed the management.

The club conducted three very successful shows, but in 1910 the industry had progressed to such a stage that it was no longer deemed advisable for that organization to try to hold the management, and the annual show reverted to the trade association. The show last year set a new mark in its line and this year it is 50 per cent greater than ever before.

On Thursday Rochester day will be observed and three special trains to carry the delegation of visitors from that city have been arranged. In the evening "society night" will be marked and the program will include several added features of entertainment.

Keeping Floor Clean

One interesting feature of the show is the method used in keeping the floors clean. The surface of the floor is covered with white canvas under all the cars and

naturally enough the mud tracked into the arsenal during such a storm as greeted the opening of the show is bound to leave its marks on such material. Under ordinary circumstances the white canvas would be marred beyond recognition in half an hour, but in the show there is a gang of ten men working constantly with vacuum cleaners which suck up the mud and dust and snow and leave the floor covering almost as clean as it was when laid.

The show marks the beginning of a new era in motordom in this part of the country, and enthusiasm, optimism and confidence in the future form the basis of a harmony in which both trade and public join.

SHOW AT WORCESTER

Worcester, Mass., Feb. 7—With a brilliant display of models awaiting the inspection of thousands of motor lovers of this city and central Massachusetts, the first show of the Worcester Automobile Dealers' Association opened tonight in the Auditorium, with an overflow show in the Franklin Square garage nearby, and it is estimated that fully 3,000 people attended the grand opening, for which an appropriate program had been arranged. The Auditorium, where nearly eighty-five cars were on the floor, presented a scene that for beauty of decoration and display outclassed anything of its kind ever held in New England with but one exception—that of the annual Boston show—while the annex, in which some thirty more cars are displayed, also presents a beautiful sight.

Fifty-five pleasure cars are exhibited at the show, six commercial cars, one racing car, one mountain wagon, four chassis, one engine and one power plant, besides various exhibits of the accessory and motorcycle dealers.

There are nineteen makers of cars represented, as follows: Cadillac, Elmore, Chalmers, Thomas, Franklin, Reo, Winton, Stanley, Overland, White, Garford, Mitchell, Hudson, Columbia, E-M-F, Maxwell, Lozier, Rambler and Brush.

BALTIMORE AWAITS SHOW

Baltimore, Md., Feb. 5—Final arrangements have been made for the motor car show to be held in the Fifth Regiment armory from February 21 to 25. The list shows that there will be in all fifty-two exhibitors. Of this number thirty-two will be motor car dealers, while the remainder will be those of supply and accessories companies. As most of the dealers handle more than one make of car, it is estimated that the total number of cars to be represented will be well over fifty. Many of the exhibits this year will be of trucks and delivery wagons, making the commercial display more extensive this year than

Improve Illinois Roads A. A. A. Slogan

ever before. The committee has decided on a uniform plan of decoration. The only individual decorations to be allowed will be potted plants and cut flowers, while the carpeting will be restricted to a green coloring. Wound about with twine, more than fifty pillars will be built up from the floor, and on the top of each pillar will be the names of the respective motor cars on a four-sided glass box with electric bulbs inside to show it off. The lettering will be in orange, with black background and ought to make a brave showing.

MOTORISTS SCORE IN BALTIMORE

Baltimore, Md., Feb. 5—Motorists of this city were victorious over the officials of Druid Hill park in consequence of a test case concerning the speed limit within the city parks which was recently conducted by the Automobile Club of Maryland. According to the prevailing state motor vehicle law, motorists are permitted to attain a speed of 18 miles an hour in portions of thoroughfares which are not thickly settled. In disregard to this provision of the state law the park board placed signs along the various driveways of Druid Hill park warning motorists that they should not go at a rate of speed faster than 12 miles an hour, under ordinary circumstances, and 6 miles an hour around curves. To test the validity of the park board rule, James Stone Reese ran his car at the 18-mile rate on a part of a thoroughfare where there was very little traffic. He was arrested and the case was tried before Justice Robert H. Carr, Jr., in the northern police station. The magistrate rendered a decision in favor of the motorist, in which he decided that the park regulation was ineffective. The decision has been received with glee by the motorists of this city.

SIOUX CITY SHOW PLANS

Sioux City, Ia., Feb. 5—Applications have been received from car factories by the executive committee of the dealers' association for five times the available space in the auditorium for the show, February 28 to March 4. This will be the second annual show, and hence the committee is highly gratified with the number of demands for space. The space allotted for the display has already been completely contracted for. The executive committee is going to spend about \$2,000 in decorating the auditorium, where the main features of the show will be staged.

The show held in Sioux City last year was the first held in the state of Iowa. It is expected to exhibit cars of a total value of \$180,000, exclusive of accessories. The business houses of the city have contributed over \$500 to be used for advertising and boosting the show and attracting people from the surrounding territory.

National Officers Hold Meeting in Chicago and Urge Westerners To Legislate for Better Highways—Efforts Now Being Made To Revive State Association—Clubs Interested

CHICAGO, Feb. 3—The meeting of the executive committee of the American Automobile Association, held yesterday afternoon at the Blackstone hotel, brought together directors from a dozen states and found President Robert P. Hooper in the chair. Good roads talk was the prominent feature of the session, although the recommendations made by the Manufacturers' Contest Association, which met here Wednesday, were given careful consideration. Upon the recommendation of Chairman S. M. Butler of the contest board, the A. A. A. executive committee placed itself on record as favoring the establishment of a board of review to hear appeals from any decisions rendered by the contest board in connection with national events conducted by the association itself such as last year's Glidden. The committee is in favor of a 1911 reliability run if the makers will support the event with a substantial entry list, and the contest board was instructed to use its discretion in the matter.

Diehl Offers Resolution

The matter of good roads in Illinois occupied the most time of the meeting and resulted in the presentation of a resolution from Chairman George C. Diehl of the good roads board, which was as follows:

Resolved, That the attention of the Illinois State Automobile Association be directed to the fact that, considering the great wealth and population of Illinois, it is one of the most backward states in the union in the construction of state roads, due not to incapacity or to lack of interest by Illinois state highway officials, but because of obsolete, defective and incomplete highway laws; and be it further

Resolved, That the Illinois State Automobile Association be urged to have prepared and press to passage a state highway law which will provide for a paid highway commission, which shall have control of all the highways in the state outside of cities and villages, and which shall prepare comprehensive plans for properly connected and constructed state and county systems of highways built in whole or in part at the expense of the state.

The meeting also placed itself on record as favoring the construction of the Lincoln memorial highway from Gettysburg to Washington, the phraseology of the resolution being as follows:

Resolved, That the American Automobile Association endorse the proposed legislation pending before congress seeking the construction of a national memorial highway from the city of Washington to Gettysburg battlefield, in honor of that hero and patriot, Abraham Lincoln.

Hope to Pass Bill

This measure passed the senate a year ago, but met the opposition of Speaker Cannon and others in the house of representatives. Now the measure is again being considered, with chances of passage somewhat improved, though an effort is being made to substitute a memorial building in Washington in place of the highway.

Following this meeting the officers of the

A. A. A. attended another session in the evening at the Chicago Motor Club headquarters in the New Southern hotel at which an attempt was made to recognize the Illinois State Automobile Association, which has been one of the weak sisters in the national organization for several years. It was not a regular meeting of the state body and was not attended by the present officers, but the call issued by the executive committee of the A. A. A. brought here representatives of five of the nineteen clubs of the state, all of whom were enthusiastic over the proposed reorganization plans.

Quincy, Rochelle, Nokomis and Roseland were represented in addition to the host, the Chicago Motor Club. Of these Roseland and Rochelle are not members of the A. A. A., but their representatives promised to join immediately. It was decided to take up Mr. Diehl's suggestion as to the good roads bill, and also to hold another meeting which is scheduled for Springfield, the state capitol, at which reorganization plans will be completed and a new set of officers elected.

PLANNING ROADS FOR ARIZONA

Tucson, Ariz., Feb. 4—Motorists and people of Arizona generally are much interested in the plans which are being formulated by J. B. Girard, territorial engineer, for the construction of several hundred miles of highways. The system of proposed roads is being carefully mapped out. The main highway will run from Globe in a southerly direction through the valley of the Gila river and thence to Clifton, on the eastern line of the territory.

From Clifton to Springerville, to the north, the forest service will construct the road for 55 miles, leading into the hitherto almost inaccessible White mountains. From a point on the territorial line east of Springerville, New Mexico will construct a road entirely across that territory designed to be a part of a great transcontinental highway.

The north and south highway through Arizona will be as follows: The road will be constructed from Flagstaff to Prescott, from Prescott to Phoenix, and from Phoenix to Tucson by way of Florence and following the general lines of the present motor car road. From this city it will be built down through the Huachuacas, reaching to Douglas and Bisbee, thence up the Sulphur Springs valley and into the Gila valley of Graham county, joining the east and west highway.

Reorganization of the Studebakers

Detroit Will Be Made Headquarters of the Merged Interests and Electric Plant at South Bend Will Be Moved—American Makers Are Looking to Europe for Big Business in Future

DETROIT, Mich., Feb. 6—Dispatches from New York, stating that the South Bend and Detroit interests of the Studebaker Brothers Mfg. Co. had been amalgamated at a capitalization of \$45,000,000 was received without surprise at the offices of the E-M-F Co., where such a move had been predicted for some time. The reorganization of the Studebaker properties will, it is believed, result in a still further expansion of the motor plants which the Studebakers have controlled here for nearly a year, and result in the centralizing of all the Studebaker motor car manufacturing operations here, under the management of Walter E. Flanders.

The operations contributing to the new organization have formed one of the most interesting chapters in the history of the motor car industry.

The original connection of the Studebakers with the E-M-F Co. was as a distributor. This was followed by the purchase of a considerable quantity of stock, secured when B. F. Everitt, William E. Metzger and William Kelly withdrew from the E-M-F Co. In the summer of 1909 the Studebakers and the other E-M-F interests developed friction which ended in a series of lawsuits, following the successful attempt of the E-M-F Co. to break its contract and sell its product through its own sales force.

Financing a Big Deal

Shortly after the decision of the courts had affirmed the E-M-F Co.'s side of the argument, the Studebakers negotiated a large loan in New York and used this money to purchase the remainder of the E-M-F Co.'s stock, securing absolute control. The loan was negotiated through J. Pierpont Morgan. The sum paid for the property was in the neighborhood of \$7,000,000. During the life of the loan the Morgan interests retained a prominent influence on the board of directors of the company.

It is understood locally that the Morgan loan has been discharged by the new corporation which, it is announced, has sold \$13,500,000 of its preferred stock to a banking syndicate composed of S. Goldman, Sach & Co., and Lehman Brothers of New York. The local inference is that this sale of stock has been employed in part, to discharge the Morgan loan, thus leaving control of the property exclusively in the Studebakers.

Will Make Detroit Headquarters

The Studebakers have made no secret of the plans they have had in view regarding the expansion of the E-M-F Co. They intend to make Detroit the location of their manufacturing operations, so far

as motor cars are concerned. The property has already been purchased for the commercial vehicle factory which they intend to establish near plant 3 of the E-M-F Co. which now manufactures the Flanders 20 motor car. It is also stated at the E-M-F Co. that the electric vehicle plant of the Studebakers, now located at South Bend, also will be transferred to this city.

The E-M-F Co. officials refuse to be quoted regarding the future plans of the company, President Walter E. Flanders included. It is believed, however, that he will remain as general manager of the motor car plants.

For several months George E. Keller, sales manager of the Studebaker corporation at South Bend, has been supervising the sales system of the Detroit plants.

More Flanders Directors

The Flanders Mfg. Co. has increased its board of directors from seven to nine members, choosing Charles L. Palms of Detroit, and Charles Splitdorf of New York, as the two additional members. The Pontiac and Chelsea plants of the company have reached the producing stage and the work of consolidation has been made in all the details.

It has been decided to set aside \$100,000 worth of stock in the corporation which will be used as rewards to department heads and others who may be deemed worthy. This is one of the pet ideas of Walter E. Flanders and was employed to a considerable extent in the E-M-F Co. organization, while it was in its formative period.

Looking to Europe

One of the features of the 1911 selling season is the attention which the manufacturers of motor cars are paying to the European trade. Many of the veteran manufacturers who have used their foreign department solely for the purpose of providing an outlet for the early winter and late fall months of the year are now taking the matter up systematically. A large number of orders are the result. To a great extent the cars which are being exported are of the light, medium-powered class. American methods of manufacture enable the builders on this side of the water to provide cars at prices which the conservative builders of cars in small quantities, according to the European system, are unable to meet at the prices quoted.

The Ford Motor Co. is the largest exporter of any of the Detroit factories. It has most of the European countries as thoroughly organized as is the case in the United States. The Cadillac and E-M-F companies are going in heavily for the

foreign trade this year. The former firm is a veteran. The E-M-F Co. has had no European headquarters until recently, having handled its trans-Atlantic agencies through an export department in New York. Foreign Sales Manager Lally of the E-M-F Co. has made an important change in this department, however, and, for 1911, the sales of E-M-F cars in Great Britain and the British possessions will be handled through a London syndicate headed by Captain A. Rawlinson and Lord Northcliffe of London. An initial order has been taken for 1,000 cars, two-thirds of which will be of the Flanders 20 type, the remainder being E-M-F 30's.

Canada a Market

Another market which is contributing largely this year is the Canadian northwest. The Ford, Regal, E-M-F and other local companies having Canadian factories report large demands from their representatives in Winnipeg this year, in spite of the partial crop failure which was chronicled from this region last year.

Companies which have no Canadian factories and are handling this demand from the United States report similar demands. The United Motor Co.'s local branch has just closed with H. D. Metcalf of Winnipeg, who has contracted to take 200 Maxwell cars and twenty-five Columbias.

Plants Are Working

Practically all the Detroit factories are now working on definite schedules of production and have their distributing agencies systematized for the season, as the result of the New York and Chicago shows. It is the universal experience that the most valuable asset for a manufacturer this year is a well organized distributing system. In fact, the difficulty attendant on the organization of such a system now is the principal handicap attendant on the bringing out of a new car. It is no longer possible for a manufacturer to organize a chain of agencies on short notice. The industry is no longer a novelty, and the many mushroom agencies which featured its early days have been abandoned, leaving the field to the established retailers. These, as a rule, prefer to handle the established makes of cars, often confining their stock to one line exclusively.

The shows of the past year saw a general revision of sales agencies all along the line, but particularly in the cities of from 10,000 to 50,000 population. This has been successfully accomplished with results which will allow the manufacturers to distribute production over the months of the season in a far more systematic manner than was ever the case before.

Cutting Down Territory

Another feature prominent in the plans of nearly all the sales managers has been the endeavor to cut down the size of the territory of firms who have had more than they could handle. An endeavor is being made to foster direct negotiations between the factory and the retailer, eliminating

the jobbers. While this cannot be done in every case, marked progress has been made.

Increased outputs were in evidence all along the line during the past week and shipments were almost on the scale of May and June. The Ford Motor Co. led the list with an average of 116 cars a day. There was similar activity all along the line, but particularly at the Chalmers, Hudson and Cadillac plants.

The Ford company is now in occupation of one of the handsomest administration buildings at the disposal of any of the Detroit factories and has moved its offices from the Piquette avenue plant, where the company has been located so long, to the fine new building which flanks the new factory in Highland Park, where the center of manufacturing activity has been located for the past year.

The new building is of two stories and embodies considerable more architectural embellishment than the immense factory building. It is fitted with the most advanced system of ventilation and heating and is so arranged that the use of natural light is possible through almost the entire working day, regardless of season. The upper floor is given up chiefly to the offices of the department heads. The lower houses the various departments of the big institution, where numbers of men and women work together. A system of 15-minute messenger service is one of the novelties of the office.

Paige Increases Stock

The annual meeting of the Paige-Detroit Motor Car Co. was notable chiefly in the increase of the capital stock from \$100,000 to \$250,000. The increase is for the purpose of extension in the manufacturing department. The following officers were elected: President, H. M. Jewett; vice-president, E. H. Jewett; treasurer, Gilbert W. Lee; secretary, William B. Cady; general manager, J. F. Bourquin; directors, the above and C. D. Warren, C. H. Hodges, E. D. Stair, Edward A. Skae, Sherman L. Depew and F. L. Paige.

The Hupp Motor Car Co. also announces its intention of increasing its capital stock from \$250,000 to \$500,000. This move is, however, of the nature of a stock dividend, the holdings of the company having increased to that figure through the investment of a large amount of profits. There is no stock on the market.

Neal at Work

President Neal of the General Motors has joined the executive staff of the company in its offices at 127 Woodward avenue and has entered into the work of systematization which is expected from his efforts. One of the interesting results of the first week of the new regime is the clearer definition of the part to be played in the reorganization by former Secretary-Treasurer Durant. Mr. Durant is now a member of the board of directors and the finance committee of General Motors, and still holds, with W. J. Mead and E. O. Wood, a vice-presidency. His headquar-

French Arrange Road Race Details

Light-Car Event Will Be Run Over the Boulogne Course, Date Selected Being Set For Sunday, June 18—Circuit is a Hilly One, With a Number of Difficult Turns to Negotiate

PARIS, Jan. 27.—Boulogne-sur-Mer has been fixed as the scene of the French light-car race to be held on Sunday, June 18. The course is a modification of that used for the voiturette race last year, the difference being the changing of one side of the triangle in favor of a wider road more suitable for the high speeds expected. Boulogne being centrally situated between Paris, London, Brussels and the Belgium

ters remain at Flint, though he is often in Detroit and New York.

The announcement that the reorganization had resulted in the abandonment of the Welch-Pontiac factory of General Motors for the purpose of manufacture of motor cars, has been followed by the statement that the company does not intend to cease the manufacture of Welch cars. These will be made either at the Welch-Detroit factory or at some other plant of the General Motors group. The Welch-Pontiac plant will make motors. The Welch-Detroit plant is now shut down.

The American Auto Trimming Co. has secured the plant recently vacated by the Hudson Motor Car Co., at Mack avenue and the railroad, and is equipping it for its new purpose. This plant was originally built for the Aerocar Co., now defunct. It is two stories in height, of brick, and is 400 feet in length by 54 feet wide. There are also a number of smaller buildings.

A Detroit branch of the Motz Clincher Tire and Rubber Co. has been opened at 999 Woodward avenue, with J. V. Harding as manager.

Railroads Using Cars

The Ann Arbor railroad, which traverses Michigan in a diagonal direction, is endeavoring to secure the consent of the state railroad commission to the use of a number of gasoline-driven cars, designed to operate in several of the line's most populous portions. Designs have been accepted and five cars have been ordered. The laws of the state, however, make it imperative that railroads charge no more than 3 cents a mile for short hauls. The Ann Arbor service was to have been based on a minimum charge of 5 cents. Just how this matter is to be settled remains in doubt. However, the Ann Arbor has secured permission to incur large bonded indebtedness to cover the installation of the cars, each of which is to cost \$22,000.

In form the cars are said to be large types of interurban. They are capable of great speed and the plan of the company contemplates that they be run on the same dispatching system as their regular trains.

frontier, is particularly convenient in view of the anticipated international character of this race. It is calculated that the contest will attract huge crowds, for Europe has been starved in the way of contests for several years.

The course is a hilly one, with a number of difficult turns, but as it possesses several long straightaways on a down grade, the maximum speed doubtless will be higher than would be possible on any other course in France. It will necessitate cars being geared very high for the easy straightaways, with a judiciously established four-speed gearbox for fast work on the winding hills. The race, which is open to four- and six-cylinder cars having a cylinder capacity of 3 liters, being equivalent to a bore and stroke varying between 3.8 by 3.6 and 3 by 6 inches, has at present attracted twelve entries from three firms. Lion-Peugeot has put in four cars, to be driven by Boillot, Goux, Zuccarelli, the winner of last year's voiturette race, and one other; Gregoire has entered four 3.1 by 5.9 inch four-cylinder motors, and Delage will run with three fours and a six-cylinder model.

Although the cars must be fitted with mudguards, running boards, and have minimum body dimensions, there is no stipulation that they must be stock models. It is declared by those entered for the race that it will be possible to obtain 70 brake horsepower from these motors and to attain a speed on the level of not less than 85 miles an hour. As there will be no motor in the race with a greater bore than 3½ inches, such a speed can certainly be considered satisfactory.

LOWELL GETTING READY

Lowell, Mass., Feb. 5.—In order to be on the safe side in case the matter of holding another series of races at Lowell is decided upon next fall Senator Joseph Hibbard of Lowell, Mass., has presented a bill to the legislature asking the authority of closing the highways there between the dates of September 1 and October 1, this year. The bill asks that the roads be closed on any 3 days during the month so that the Lowell Automobile Club may be able to decide upon some races. As there are two holidays here, one Labor day and the other Columbus day, October 19, the bill may be amended to include the latter date in case any decision is reached for a later race than September. There seems to be some sentiment in favor of a race on Labor day, but one in the middle of the month will probably meet with opposition, as it did a year ago. However, that is up to the club officials.

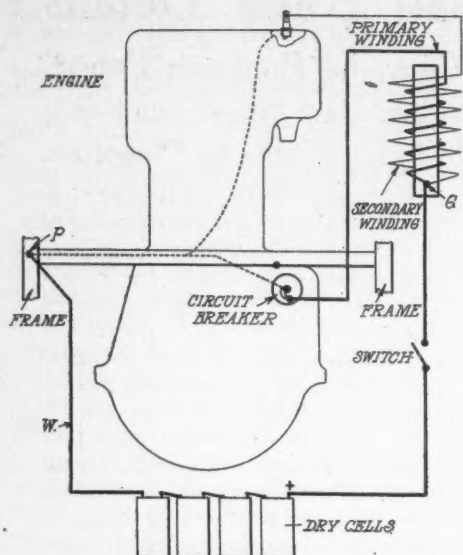


FIG. 1—DRY CELL WIRING DIAGRAM

WEAR OF VALVE TAPPETS

WACO, Tex.—Editor Motor Age—I notice in the January 19 issue of Motor Age an inquiry as to why the front valve tappet usually shows more wear than any of the others. Motor Age seems to think it is probably caused by the front camshaft bearing receiving more strain than the other bearings, as it carries the gear on that end, too. I have had a great deal of trouble with valve tappets and have found that the excessive wear on the front tappet is caused by the dust and grit coming through the radiator and settling on the front of the motor. Of course this grit greatly aids the wear on this front tappet. To prevent this I take a piece of light steel and make a shield for the front end of the motor, letting it extend down past the first valve stem and spring. I find it very convenient to fasten it under the front cylinder bolt on the valve side.—R. A. Gimsan.

WIRING FOR DRY CELLS

Cleveland, O.—Editor Motor Age—Will Motor Age through the Readers' Clearing House kindly give me a diagram of the wiring of a motor car using dry cells, tracing only the current through the primary and secondary windings and giving the point at which the current is ground to the frame?—R. B.

When asking for a wiring diagram, if the name of the make and model of the car is given, the number of cylinders of the motor, the cycle, and whether or not a vibrator or non-vibrator coil is used, were given, a more intelligible answer and diagram can always be given for questions such as yours.

In the diagram illustrated in Fig. 1 a one-cylinder motor is indicated with the current originating in a set of four dry-cells and passing through an induction coil of the non-vibrating type. The primary current leaves the carbon or positive pole of the battery at the right, passes up through the switch and primary winding of the coil, to the circuit-breaker, through

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the metal of the circuit-breaker to the metal of the engine and the cross-member of the frame supporting it, and back to the negative terminal of the battery through the ground wire W which is attached to the frame at the point P. The secondary current, which is induced in the secondary circuit every time the primary circuit is broken in the circuit-breaker, flows in two directions from both ends of the secondary winding of the coil; the current from one end of the secondary winding flows to the insulated terminal of the spark plug; the current from the other end, which is grounded onto the primary circuit at the point G, flows through the positive battery wire, through the dry cells, the negative wire, the frame, the metal of the engine cylinder and the ground portion of the spark plug; then the spark occurs at the points of the spark plug and the secondary circuit is complete; when the primary circuit is again broken in the distributor the operations are repeated.

MAKES A CORRECTION

Indianapolis, Ind.—Editor Motor Age—In the Readers' Clearing House columns of January 19, answering Dunolly, Australia, the first answer is correct for flat-

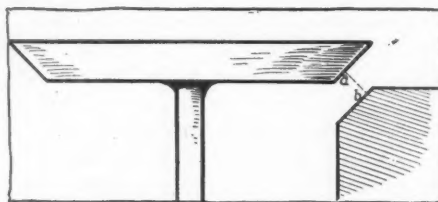


FIG. 2—APPROXIMATING VALVE LIFT

seated valves only. It should have read the valve port area is equal to the mean circumference of the valve, multiplied by the lift, multiplied by the cosine of the angle of bevel to horizontal. The product of the last two quantities gives the perpendicular A B, Fig. 2 the distance between the two surfaces, which is the other dimension.—A. L. Sheridan.

TESTING WITH AMMETER

Homewood, Miss.—Editor Motor Age—Through the Readers' Clearing House kindly explain in detail how to test dry battery cells with an Ever Ready ammeter.—W. W. C.

To test dry battery cells with the ammeter mentioned, apply the instrument to each cell separately as illustrated in Fig. 3, press the spur S, on the lower part of the instrument, firmly into the metal connection C of the carbon or positive pole of the battery cell B, and the spur R on the flexible cord into the zinc or negative terminal N of the battery. The average dry cell, 2½ by 6 inches, should test about 20 amperes at the time of purchase. A

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

near estimate of the capacity required for a fresh and efficient dry cell varies from 15 to 20 amperes, and from 1¼ to 1½ volts.

When purchasing dry batteries, however, always test with the ammeter, as an exhausted cell will register almost the same voltage as a new cell. When applying the combination instrument, known as a volt-ammeter, for a test, follow the same directions, applying the spur designated by an A or Amp. on the face of the meter for amperage, and the spur opposite the V or Volts for voltage. The amperage reading is generally indicated on the upper scale, and the voltage on the lower scale, or vice versa.

Never use an ammeter on a storage battery, as you will damage both the battery and the instrument. After cells have been used for some time and their efficiency is doubted, test them immediately after a run and not before, as they recuperate when standing idle and will give a false reading; that is, they will show a fairly good amperage and will run the motor very nicely but will run down very quickly, perhaps before you have gone a mile, more or less. A cold cell, too, will give a poor reading when cold, though it is still in good condition.

It is claimed that dry cells can be stimulated for a short period by boring a hole

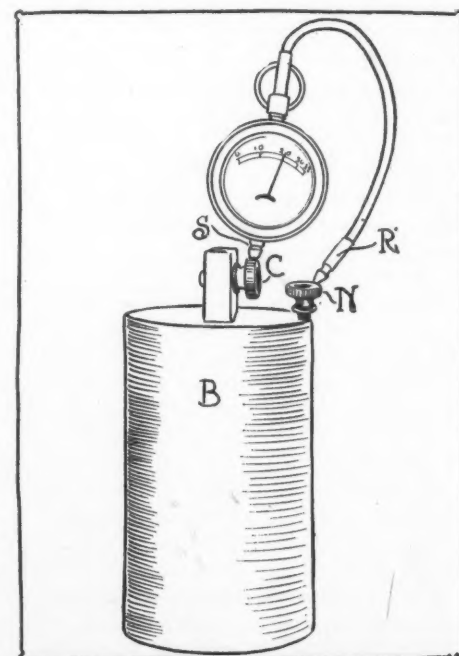


FIG. 3—TESTING DRY CELLS

Clearing House

EDITOR'S NOTE—To the Readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated.

in the wax and pouring in a little vinegar or water; and it is further claimed that extra mileage can be secured from two run-down sets of dry cells by wiring them in multiple or parallel, using but one side of the switch.

BENEFITS OF A BREATHER

Chicago—Editor Motor Age—Will the Motor Age advise me through the Clearing House if it is injurious to run a two-cylinder opposed 5 by 5 four-cycle motor with the breather removed or plugged up tight? What are the benefits of a breather to the motor?—O. Langner.

It will undoubtedly be injurious to plug up the air vent or breather. The air vent is necessary to keep the pressure in the crank chamber normal, so that the moving pistons will not have any effect upon the lubrication.

DELCO IGNITION SYSTEM

Denver, Colo.—Editor Motor Age—Will Motor Age please explain and illustrate the Delco ignition system used on the Cadillac 30 touring car?—L. V. S.

Figs. 4 and 5 show the wire connections or wiring diagrams of the Delco ignition system and these illustrations are practically self-explanatory. The four timer wires go to the four outside binding posts of the coil box, the center one, which is the common wire, leads to the carbon or positive pole of the battery. The single outside terminal of the relay is connected with the zinc of the battery. The other outside terminal of the relay connects with the outside terminal of the switch. The third terminal of the relay is connected to the center terminal of the switch. The terminal of the switch which holds it to the dash connects by a ground wire to the engine frame.

The circuit is a simple one; from the carbon of the battery it passes to the common or center connection of the coil box through one of the primaries and one of the commutator or timer contacts to the ground. Through the ground it passes to the switch; from there to the heavy winding of the relay, which is the circuit-breaker, and back to the zinc of the battery, thus completing the circuit. In addition to the circuit just traced, an extremely small current passes through a fine winding on the relay. This minute current follows the same course exactly as the large current as far as the switch. There it comes out on the center switch terminal and goes to the center relay terminal, where it passes through the fine winding, coming out on the same binding post as the heavy current, thus completing the circuit. This auxiliary circuit takes a separate path at the switch so that the starting button at the top of the switch can be utilized to open and close it when desired. This circuit is graphically shown at G, Fig. 4.

The controlling relay is used for the purpose of breaking the primary circuit, and thereby producing a spark from the secondary windings of the induction coils. It takes the place of the four vibrators on an ordinary coil unit, as it acts for each coil in turn as the commutator makes connection. In this way it replaces what is commonly known as a master vibrator. It differs from the ordinary vibrator, however, in that it uses but one spark for each contact of the commutator. The coil of the controlling relay is composed of two windings; one heavy winding P through which the primary circuit passes when the timer makes contact, thus drawing down the armature and opening a contact in the primary circuit. With this opening the armature would again return to its first position, making contact and breaking it again as an ordinary vibrator, if it were not for a second fine winding wound on the same coil, but shunted around the contact. The current flowing through this prevents the armature from closing the pri-

mary circuit until the timer slips off contact, when this auxiliary circuit is open, thus releasing the armature and allowing the contacts to come together and be ready to break the circuit when the timer makes the next contact. When the button at the top of the switch is pushed in, it opens this auxiliary or holding coil and permits the armature to vibrate the same as any vibrator, sending a shower of sparks to the cylinder for starting the motor in an easy manner.

The switch, which is the only thing located on the dash, takes care of both battery and magneto. It has three positions—off, battery and magneto. Its operation is as follows: When the lever is at off position the push button at the top when pressed in will lock; this converts the controlling relay into a vibrator, and facilitates cranking in cold weather, as a number of sparks will be delivered to the cylinder instead of a single one.

To start from the spark one has but to kick the switch lever over to the battery side, and if the motor does not start press in the button for a moment. This will start the motor if the proper charge is in the cylinders. The switch may also be kicked over to the magneto side and then the push button pressed in with the foot, which will start the motor from the battery, and as soon as the proper speed is reached the magneto will take care of it after that.

The system designed for the 1911 cars is shown in Fig. 4. It uses only one non-vibrator coil, instead of four, with a secondary distributor. The timer is a single-point contact operated on the same shaft as the secondary distributor. The interrupter and the switch are like those used in the 1910 cars.

ALCOHOL AS ANTI-FREEZE

Benedict, Kan.—Editor Motor Age—Can alcohol be used in a generator for lights, where carbide is used? What per cent of alcohol should be used as an anti-freezing mixture for lights?—B. R. Riley.

Alcohol anti-freezing solutions can be used in the acetylene gas generator, and denatured alcohol up to as high as 25 per cent alcohol may be used without affecting the lights. There is very little loss from evaporation.

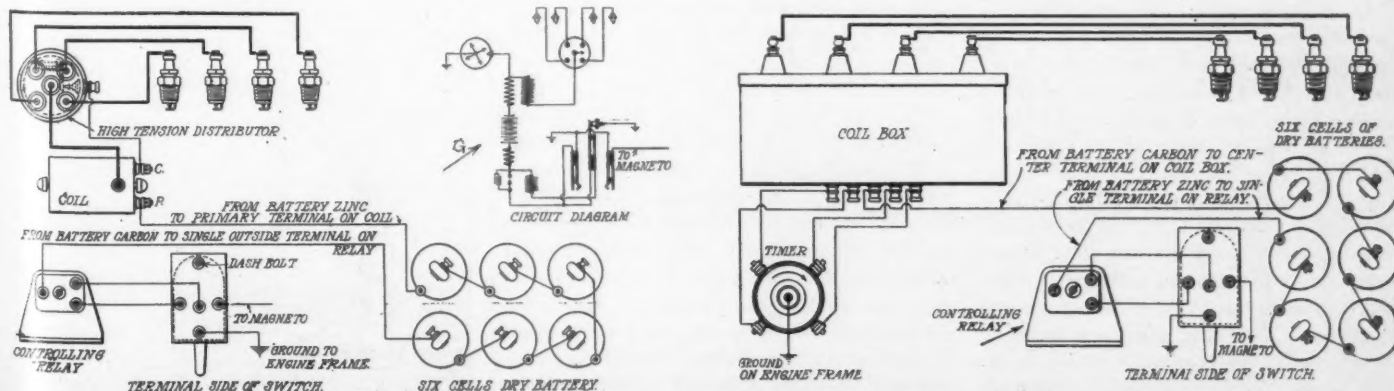


FIG. 4—DIAGRAM ILLUSTRATING WIRE CONNECTIONS USED IN 1911 DELCO IGNITION SYSTEM; FIG. 5—THE 1910 SYSTEM

The Motor Car Repair Shop

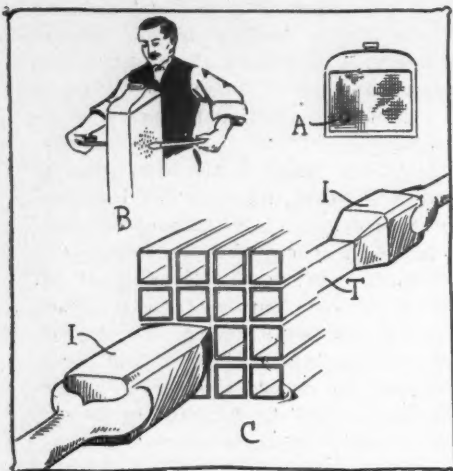


FIG. 1—REMOVING RADIATOR TUBE

GENUINE honeycomb and cellular radiators are made up of a great number of small square or round tubes which are arranged horizontally side by side, so that their length constitutes the thickness of the radiator, and so that there is about 1-16 inch space between the sides of adjacent tubes. The ends of these tubes are soldered together so that a great many water-tight ramifications are formed between them when the assembly of small tubes is complete, and each tube itself is open for the air to pass through it and carry off the heat, that radiates from the water in the ramifications through the metal sides of the tubes. It may sometimes happen that one of these tubes will spring a leak, or a hole will be made in the radiator as a result of a collision and several of the tubes damaged, so a few words on how an effective repair may be made should be of interest.

How Repairs Are Made

If the leak should happen to be in one tube only, it may be repaired in several ways. If the tubes are round, and a roadside repair is necessary, one has but to plug both ends of the leaky tube with a piece of soft wood, a lead pencil or, perhaps, better still, with the round rubber erasers from a couple of lead pencils; a permanent repair may be made either by removing the tube and replacing it with a new one, or by plugging both ends of the leaky tube with a pellet of lead and then fusing the lead of the pellet with that around the ends of the adjacent tubes. A square tube radiator can be treated in a similar manner, except, of course, square pieces of wood or lead are required. When, on account of a collision, a hole has been made in the front of the radiator only, and one has no extra tubes on hand, a plate of copper preferably, or tin or brass, should be cut to cover the hole or the ends

Hints for the Amateur

of the injured tubes and this plate soldered into place, as indicated at A, Fig. 1.

At B, Fig. 1, is shown a method of removing the tubes from a cellular radiator. One has but to apply two heated soldering irons to the ends of the tube to be removed and when the solder around the ends of the tube melts, push the tube one way or another till it is free and one of its ends extends out slightly beyond the face of the radiator, then take hold of the tube with a pair of pliers and pull it out. To replace the new tube, wrap a piece of copper wire around its ends and slip it into place, then lay the radiator flat on its face or back and solder each end of the new tube flush with the ends of the others. The two soldering irons I, in the act of loosening the tube T of a section of a radiator, is illustrated at C.

Use of the Blow Pipe

In Fig. 2, a very unusual type of blow pipe is shown, which is used to a very good advantage by a Chicago repairman

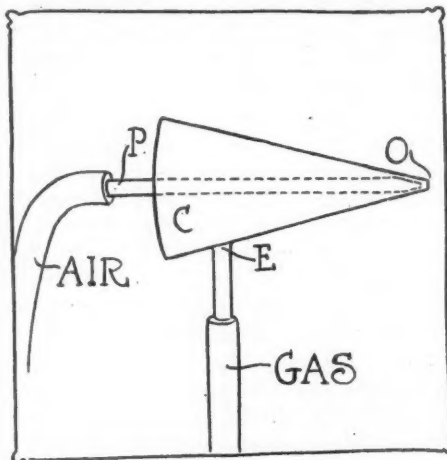


FIG. 2—AN ODD FLOW-PIPE

in affecting repairs on radiators. The hollow cone shaped receptacle C is made of sheet brass and is open at O; gas from a pipe running along the bench is conducted to the torch through a rubber hose connection and enters the cone-shaped receptacle or casing at E; and a similar rubber hose connection conducts a current of air to the pipe P, which penetrates the back end of the cone-shaped casing holder and extends axially through it almost to the opening O, as indicated by the dotted outline. This pipe is choked or constricted at the end so that a long narrow stream of air issues from it when in use; and ending just behind the opening at the point of the cone-shaped casing as it does, when a current of air issues from the end of the air pipe, gas is mixed with it in such

proportions that an excellent long narrow flame is obtained when ignited.

There are a great many motor car repair shops in which the workmen are put to considerable inconvenience, and in which much time is lost and work poorly done, all for the want of good lighting facilities. It is by no means unusual to find a repairman working at a bench with a drop light lying on the bench beside the work, or hanging on a nail on the wall, and every time he wishes to closely examine his work he must lay down his tool, pick up or detach the light and hold it closer to the part on which he is operating, then he must replace the light and pick up the tool when operations are resumed. Often the workman's hands are greasy, the lamp is besmeared and its lighting efficiency greatly impaired; the cord near the lamp also is generally oil-soaked, short circuits often occur, and the expense for new lamps that are broken, new extension cord, new fuses, and time lost in using the lights at a disadvantage and for repairs to the lighting equipment, is rather a large item in the long run.

Give the Repairman Light

One of the best methods of illuminating the workbench is illustrated in Fig. 3, all wires are thoroughly enclosed, in metal conduit arranged under the workbench and at convenient intervals there is an extension to which a flexible metal conduit is rotatably attached. This flexible conduit encases the wires and supports the lamp and shade, and it is sufficiently stiff to hold the lamp in any position desired as is indicated by the dotted outlines. Lamps of this type are used throughout the Ford factory, and they have not only proven practicable by facilitating the operations of the workmen, but the saving in equipment, time and insurance is enormous. Insulated conduit of both the rigid and flexible kind is obtainable from any of the larger electrical supply houses.

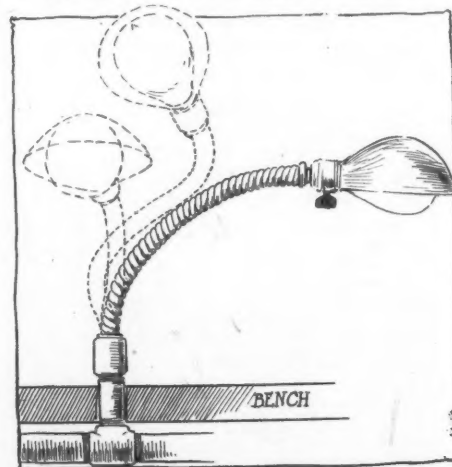
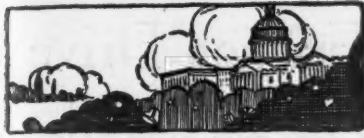


FIG. 3—ADJUSTABLE BENCH LAMP



Current Motor Car Patents

NEW Friction Clutch Design—No. 981,295, dated January 10; to Paul B. Marfield, Cincinnati, Ohio.—This patent relates to a clutch which might be known as an expanding ring or shoe type; and as illustrated in Fig. 1, is comprised of a shell S which in a motor car would be formed by the rim of the flywheel, a carrier C secured to the motor crankshaft, a segmental ring made of segments G and G1 adapted to engage the shell S, a series of levers pivotally secured together and adapted to be shifted to expand the ring, a plate P rotatably secured to the carrier and having eccentric slots T formed therein, fulcrums for the pivoted levers having lugs engaged in the slots, and means for adjusting the fulcrums of the operating levers and securing the plate in the desired position. The rotating of the plate P serves to shift the fulcrums and expand the segments G and G1 against the rim of the flywheel of the motor of the car.

Slide-Valve Motor—No. 982,286, dated January 24; to Ivor Edwin Mercer, Gravesend, Eng.—This patent relates to an internal combustion motor valve design in which the cylinder ports are opened and closed by a sliding shutter which has a stem attached to it that may be operated from a camshaft, in the same way in which the poppet valves of an ordinary L-type motor are now operated. The design is illustrated in Fig. 2, with the valve-port P open; the valve-shutter S being shown lowered into a recess designed for it. This shutter is adapted to move upward and cover the port P to close the valve, and it has two packing rings R with springs behind them for the purpose of making the valve gas-tight and operative regardless of the variations in temperature and consequent expansion. The valve is operated by means of the stem T; and the shutter may be taken out for cleaning or inspection

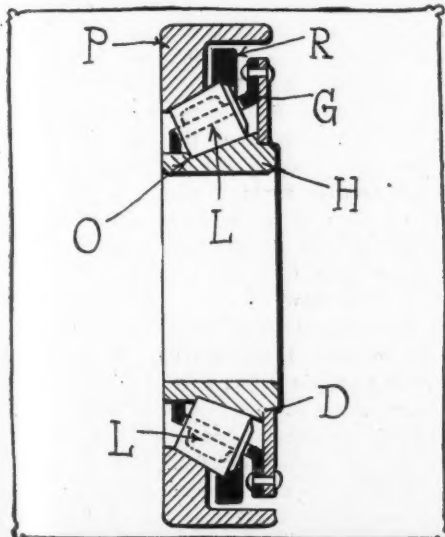


FIG. 3—TAPER ROLLER BEARING

Late Ideas of Inventors

after the plate E has been removed by the operator. The valve is not swept by the exhaust gases.

New Taper Roller Bearing—No. 982,512, dated January 24; to Charles S. Lockwood, Newark, N. J.—The new taper roller bearing to which this patent relates is illustrated in section in Fig. 3, and comprises a conical hub H, having an inwardly facing shoulder O at its smaller end and an outwardly facing shoulder D at its larger end. There is a series of tapering rolls L fitted to the hub with their smaller ends against the inwardly facing shoulder; and a guard ring R, having an internal groove, embraces the outer edges of the larger

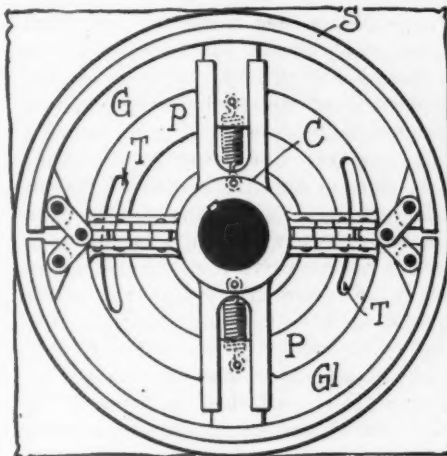


FIG. 1—FRICTION CLUTCH DESIGN PATENTED BY P. B. MARFIELD

ends of the rolls. The cage G has openings fitted to the rolls and means to retain them upon the hub, and there is a separate flange F riveted to the cage which is designed

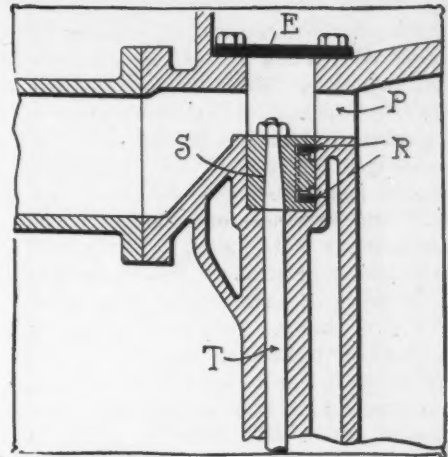


FIG. 2—SLIDE-VALVE MOTOR BROUGHT OUT BY MERCER, OF ENGLAND

to contact with the outwardly facing shoulder of the hub. This type of bearing is adjustable, and is practically comprised of but two units; the cup P or outer race being one unit, and the hub or cone H with the rollers and cage attached, the other unit.

Muffler for Explosive Engines—No. 978,287, dated December 13; to Albert H. Crewe, Des Plaines, Ill.—As illustrated in Fig. 4, this patent applies to a muffler for explosive engines comprising a casing C, having an inlet opening I at one end and an exhaust opening X near the opposite end. There is an expansion chamber M at the inlet end of the casing, a spiral tube T within the casing, which communicates between the chamber M and the exhaust opening, and a sound-insulating material packed around the spiral tube. A partition P separates the expansion chamber from that portion of the muffler containing the spiral tube and sound insulating material.

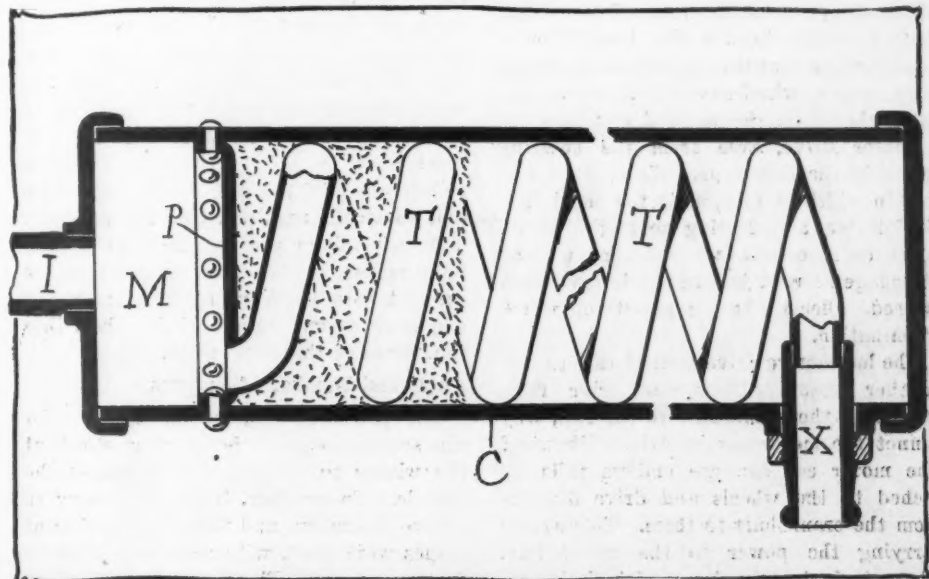


FIG. 4—CREWE'S DESIGN OF MUFFLER

Charles Duryea's Comments on Frictionless Friction Drive

THESE are possibilities well worth your attention which come quite reasonably within the above heading. I once asked a prominent automobile engineer his opinion of friction drives, meaning the usual disk type. He explained that they were frictional and lost too much power in that friction. This is a serious objection, but in spite of it they are doing good work in many instances and their simplicity and sweetness of action commend them to many. They must be stiffly built and mounted in strongly braced frames; and in spite of these things they sometimes give trouble. To get the necessary strength they must have weight. And the friction coefficient is so low around .25, if in good order, and usually less, especially if dry or oily, that the pressures must be abnormally great. This means strong operating devices. Further, they must be just in line, one with the other, or the driven disk will creep to one side or the other and add needless friction if resisted. These facts have been well set forth by writers on the subject.

We still have the query, "Is a friction drive that may be recognized as practically frictionless, possible?" We know that bearings nowadays are made with fine steel balls, rollers or cones, and so nicely fitted to suitable races that they are termed with good reason "anti-friction bearings." We know that the locomotive and the trolley car drive by friction of their wheels on the rails; just as does any self-propelled vehicle, with the difference that the steel wheel on the steel rail has very little resistance to rolling, practically no friction. Yet it is a friction drive if we take these words literally.

Roller Drive

The term "friction drive" has come to be so universally applied to devices rolling in planes at right angles to each other, and quite often adjustable as to the distance of one from the axis of the other, that I prefer to use the term "roller drive" when considering propulsion by the same plane wheel-on-the-rail type. We have, therefore, the needful elements for a motor drive, free from the twisting found in the disk type. We are not limited in width of face, as is the usual friction device, and, having no teeth like on gears or sprockets, we may engage and disengage at will, just as a friction clutch is used. Clearly, here is something worth examination.

The locomotive drive method carries still another lesson. If it can drive from wheels on the crankshaft to the rail, why cannot the motor car be driven likewise? The motor car can use endless rails attached to the wheels and drive directly from the crankshaft to them. This avoids carrying the power to the wheel hub, where it is largely force with little motion, but instead stops it near the wheel

Editor's Note—The following paper on "Frictionless Friction Drive" was read at the recent meeting of the Society of Automobile Engineers by Charles E. Duryea.

rim, where it is largely motion with little force. This in itself is a gain; for it saves the heavy, strong parts needed to resist the turning forces found near the wheel axis.

So, in using this roller drive, the first move is to bring the engine into a position where its shaft lies parallel with the rear axle and where wheels on the shaft ends may run on the tracks or rings attached to the vehicle wheels. We next arrange so that the driving and driven members, the rollers and rings, may be brought together at will. This may be done by swinging either the engine or the vehicle axle. And this swinging must be accomplished by an amount of effort well within the capability of the average driver. Since the materials are steel against steel, one of which, the roller, is hardened for durability, it is evident that the amount of motion is not great, and this permits the use of a lever to bring them together; this lever having eight times, more or less, the motion of the engaging parts. Use has shown that even with the movement required to engage a low and reverse drive this amount of motion is not excessive, and the pressure required to drive a four-passenger surrey is not objectionably great. With two people aboard and the ratchet disconnected, a spring scale showed that on the level 10 pounds would drive 80 pounds at the roller contact points. On a 13 per cent grade, 25 pounds was required; and in soft surface upgrade as much as 50 pounds was used, while still higher pressures are sometimes needed in very bad cases. The majority of the roads required less than 20 pounds, and but little more than 25 pounds took all the power of the engine on the high, although so easily is the ratchet lever set forward that it was found common to set the contacts much tighter than this in a hard pull. The low was not measured, for the reason that hills up to the ability of the low were not easily at hand even in hilly territory. The low rollers are half the size of the high ones and so would require twice the pressure. The low rollers are by the side of the high rollers, on the same shaft, and are brought into position by telescoping the engine shaft-ends so as to bring them into the planes of the wheel rings.

Angle and Number of Grooves

The pressures selected as suitable for the service require the driving effect at the wheels to be sufficient to propel the vehicle. To get this, it was necessary to groove the rollers and rings. A number of angles were tried, with more or less satisfactory results. Finally, a groove of 40 degrees was adopted as being reasonably

free from friction and yet of good pulling power. To secure ample surface for long life several small grooves are employed, instead of a single one of large size. A further advantage is that the short surface angles have less friction loss by the slight twisting action of the surfaces on each other. Thus the friction surfaces are under $\frac{3}{8}$ inch wide, six or eight in number, giving a friction surface 2 inches to $2\frac{1}{2}$ inches wide, with no part thereof more than $\frac{3}{8}$ inch from the central line of neutral slip—no twist. The amount of friction surface can be increased at will by adding more of these grooves, without increasing the loss. Thus the life of the device can be made as long as seems advisable, with no loss except the added weight and cost and the necessity of telescoping the shaft ends further in changing the ratios. If the twisting loss is made less by the use of narrower surfaces, there is more danger of the roller running in the next groove, instead of in its proper position; but this loses the use of one groove only and in no way affects the drive except that the life of the used grooves is slightly lessened. Since friction is largely independent of surface, the drive is as perfect when one groove is used as when all are used. But the strength of the metal may not be high enough to resist the effort and the wear may be rapid.

Loss in Roller Drive

Having found these relations and facts, and used the device very satisfactorily for some years, it became a matter of curiosity to know what the loss in this drive is. The engine was therefore removed and one roller and wheel left in place, with a straight shaft in the place of the engine shaft. This shaft was mounted on the usual roller bearings and a string wrapped around it, with a weight at its end sufficient to overcome the slight friction of the rollers. The wheel, being ball-bearing, was carefully balanced and turned so easily that no appreciable weight seemed necessary to start it revolving. Having overcome these frictions, it seems apparent that any resistance to revolution when the contact pressure is on must be due to the friction and pressure of the drive.

Since 50 pounds at the clutch lever was enough to take the full power of the engine on high at moderate speeds—doubtless the speeds of greatest torque—this condition was first reproduced. A rope was carried forward from one bearing of the roller shaft, over a pulley, and 200 pounds of iron hung thereon. Since this drive is a double drive, only half the total pressure comes on a single roller and ring. With this pressure it was possible to raise 100 pounds from the floor, by a rope attached to the rim of the vehicle wheel, when the roller shaft was turned by the starting crank. It is not believed that this represents the full and usual ability with

such a pressure, for the reason that neither the roller shaft nor the vehicle wheel had any appreciable momentum under such conditions. It is evident that neither the roller nor the ring is absolutely perfect and certain that some points would have a slightly greater friction grip than others. In actual service, after the vehicle is started, the engine fly-wheel keeps the shaft which carries the rollers moving with a fairly steady angular velocity; while the weight of the vehicle acts as fly-wheel or a store of momentum for the vehicle wheel. The result is that in actual work an average frictional coefficient does perfect work, but in the test mentioned the minimum frictional ability had to be taken, because, if not, at points of least friction the load would slip back, having no moving mass to continue it in motion past such points. Having determined, by repeated trials, the amount of load possible to lift, a string was wound around the wheel and by pulling it with a spring scale the force necessary to turn the wheel and shaft was ascertained. This was found to vary somewhat, but ran closely to 10 pounds. Running the string over a pulley and applying a weight would probably have been a more even way of ascertaining this force, but the distance required for the weight to fall excluded this method. Thus we see that of the work done by the engine 10 pounds goes into turning the parts and 100 pounds into work done; a friction loss of 9 per cent.

Preparing for Test

In making this test, the wheel channel where the strings were applied measured $42\frac{1}{4}$ inches diameter; while the driven ring pitch line was but $32\frac{1}{2}$ inches diameter. To make the test more certain, a pulley had been fitted to the roller shaft bearing the same relation to the roller pitch line. Winding the string about the pulley gave the same pull as nearly as could be read. The load was also applied to this pulley and lifted by turning the wheel. These dimensions show that the driving ability at the pitch lines is greater than the 100 pounds lifted by a ratio of 13 to 10. So the actual tangential force at the pitch line radius was 130 pounds, with a pressure of 200. This indicates a friction coefficient of .65, a vast gain as compared with the .11 steel wheels on steel rails at 10 miles per hour. This gain in driving ability has of course been made by the grooving of the rollers and rings and at a loss of some part of the 9 per cent total loss in this drive, part of which is in the bearings of the wheel and roller shaft; but the major part is due to the loss in the friction surfaces.

This coefficient is remarkable also when compared with the .18 to .27 of straw fiber and aluminum commonly used. But we must remember that this is the maximum high gear condition and not the usual condition. The next test was made with 100 pounds weight on the roller bearing shaft rope, and it was repeatedly shown that 70 pounds could be lifted. The force

required to turn the parts under this pressure was a scant 8 pounds, representing about 10 per cent loss. The tangential force at the pitch line was 92 pounds, representing a friction coefficient of .92. This represents the pressure conditions under which a 13 per cent grade was climbed and speaks for itself. Neither of the two experienced drivers in the vehicles during the climb was able to detect that the drive was slipping.

Novel Demonstration

The next test was made with 50 pounds on the rope and represents the pressure needed to run on good roads of fairly level surface. Fifty pounds was lifted and about 4 pounds required to turn the parts. The friction loss is therefore about 7% per cent of the total power expended in turning the shaft. The tangential pitch line force was 66 pounds scant, representing a friction coefficient of 1.31. These results from the two last tests show that the drive does not add to the duty required of the axle bearings, but actually takes therefrom. The power of the engine transfers a part of the weight of the vehicle to the driving rings and thus relieves the axle of carrying this amount. The effect is as if a passenger should get out of the vehicle and get his transportation by climbing upwards on the wheel spokes as the wheel revolved; with the difference that the roller drive, to get this effect, must apply pressure which the wheel bearings must take; but this pressure (less than the weight saved them) is applied horizontally and adds no wear or strain in the vertical direction. It therefore does not increase the wear or shorten the life of the fixed parts and adds no breaking strain to any of the parts.

The average of the three tests is an efficiency of 91% per cent, a loss of less than 9 per cent.

I do not have at hand recent figures as to the efficiency of other systems, but doubt that others can get the power from the end of the engine to the wheels with

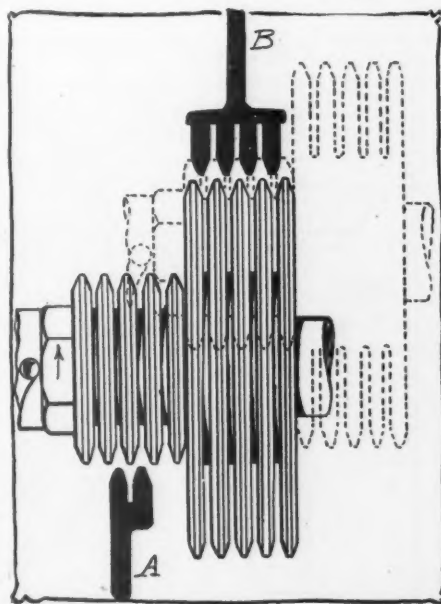


FIG. 1—ROLLER DRIVE

so slight a loss as this. Certainly the usual type of friction device does not show this high efficiency of power transmission.

M. O'Gorman, a prominent engineer, before the British Society of Arts some years ago, credited the single-chain drive—crankshaft crosswise the vehicle—with 85 per cent efficiency; the shaft drive with 69 per cent, and the same, with jackshaft and two chains, with but 50 per cent to 58 per cent efficiency. Compared with such figures—remember that the usual disk friction would be rated lower—you must admit that an efficiency of 91% per cent is getting pretty well into the frictionless class. I have not mentioned or tested the low gear, for the reason that in my light high-powered, low-g geared solid-tired vehicles this is seldom used. Months at a time, with daily driving, go by, with no use of the low gear even for starting. The clutch action is so perfect and the power so ample that these rigs start on the high with no trouble or loss of time. If the rings are very severe there is a chatter like the chatter of a severe brake band, but this is no more a matter of concern than the brake chatter or the clash of gears, and is easily stopped with little loss of ability by a slight application of oil or grease. This seldom occurs with rings of proper hardness. It is quite apparent that these figures must vary with a change of the angles of the grooves or of the material used.

It is undoubtedly true that in this drive, as in all others, part of the friction is due to the pressure load on the bearings, and the fact that the rollers and rings wear very slowly and have a long life, thousands of miles, bears out the tests, showing that there is not a great amount of friction between the surfaces. To test this point further, two weights of 50 pounds each were hung from the pulley on the roller shaft by a flexible cord and test weights applied till the shaft turned. Under this load the shaft turned much more steadily than with no load and did not feel the slight stiffness at points noticeable in the unloaded test. The weight needed to turn the unloaded shaft was first applied and the additional weight to turn the shaft with load was added. This was less than 1 pound (1 per cent), and may have been as low as $\frac{1}{2}$ per cent, because this test was hurriedly made.

Life of Roller Drive

The life of this device has not yet been established. Buggyauts have been sold for four summers, but no rings considered of proper hardness have been replaced in that time. Cast-iron rings having four ridges—eight surfaces—were tried, and wore out in 500 miles of severe work, with much slipping in starting and nursing the engine to avoid using low gear. Rings of soft steel will sometimes start cutting and tear themselves to powder in 1,000 miles or so. Generally they can be saved by a slight application of grease or graphite. But they chatter more frequently and have

no advantages except that the rollers take hold with less pressure.

The ridges are made of stock $\frac{1}{8}$ inch thick and set with $\frac{1}{16}$ inch clearance. The small roller is one piece, but the large rollers are built up of disks and spacers to avoid the difficulty of cutting the narrow grooves. They are of saw steel and hardened. The rings consist of a main body of T-iron electrically welded to length, carefully trued to a circle and turned on their inner surfaces, in which three or four slight grooves are cut. Into these grooves the wearing rings are placed. They are rolled edgewise to a true circle and simply snapped into these grooves by springing the ends sidewise and butting them together, followed by forcing them back into their plane. They are thus easily renewed when this becomes necessary. The reverse driven-ring is usually made of one solid piece, turned to shape with no provision for renewal, because the amount of use it gets will not wear it out in years.

This description fits the usual arrangement wherein the forward driven-ring is the larger one. In some instances the smaller ring is the one used for forward driving, and in this case the wearing rings are welded to size and heated, to expand them so that they may be gotten into their respective grooves, and then shrink tightly therein. This method is not considered the best, because the rolling action may expand the rings and loosen them; and the friction loss is undoubtedly more, because there is more twisting action when the roller is outside of the circle instead of inside, just as is true with external as compared with internal gears.

Some use has been made of an idler to drop into the roller and ring and transmit the power in a reverse direction. This is used in the Tri-van, a light three-wheeled delivery cart. It saves telescoping the crankshaft extensions, but is not considered the better way so far as it has been used. It offers a means of getting a considerable gear reduction, if made with its driven ridges of one diameter and its driving grooves of a smaller diameter.

Use of the Differential

In conclusion, I would call attention to the fact that trolley car and locomotive practice have been followed not only in placing the crankshaft and in the roller type of drive, but in the absence of a differential. These vehicles must carry their weight on their wheels, and so any slipping of the wheels on the rails in turning corners is productive of considerable friction. But in the roller drive the pressure is not a large proportion of the weight under usual conditions and very little friction results from the slipping of a roller in turning a corner. Continued tests of these vehicles, both with a roller-releasing device and without, have shown so little actual difference that the differential substitute has been abandoned, with some gain in simplicity. On a very slippery asphalt street, with contacts tightly

set, the steering wheels may show the need of a differential, but there is so much friction in most differentials that little choice remains. The use of the roller-releasing device gave results superior to a differential, because the inside roller was released when the steering post was turned. This caused the outside wheel to drive and assisted around the corner, with noticeably superior results. The few occasions when the steering wheels have not ample grip to properly steer around the corner, do not warrant the added cost and pieces, even though few. I know that the frictional coefficient of wheels on rails decreases as the speed increases, but this is due to the fact that the wheels bounce and so lose contact. I do not think this loss of coefficient holds true in my system, where the contacts are forced together. I know that, like any friction drive or brake, they hold and drive better after the two parts have ceased to slip on each other. This is simply another way of saying that the standing friction is greater than the sliding friction; and that the rolling of the parts on each other does not destroy this standing friction.

History and Usage

Historically, I believe, the grooved friction gearing is quite old and undoubtedly goes back to or beyond the use of pin and lantern gears. Being produced by turning, instead of by milling, it would naturally be used to avoid cost in the early days when tooth-cutting facilities were not to be had. It must have been obvious to anyone that one wheel pressed against another would partake of the motion of the second one; and equally obvious that if the first could wedge into a groove in the second the driving ability could be greater. But in those days of friction bearings, the pressure needed to get the driving friction would create a lot of objectionable friction in the axis bearings, and on this account the device would not find favor where toothed gearing could be used. It is evident that the anti-friction bearings

of today relieve the device of that objection. It was used in Reading as much as 35 years ago for the purpose of hoisting bricks and clay on and off canal boats. It is used in foundries for turning tumbling barrels and similar service, where toothed gears do not last one-quarter as long. In well-drilling hoists and similar places, where there is a more or less constant exposure to mud and grit, it gives fine service. Practically, it seems to be the one drive which does not suffer by such exposure. Grit helps the surfaces to take hold of each other. I have even wondered if the presence of grit did not keep them apart and prevent wear. We drive without reference to mud. Sloppy, gritty mud, a foot deep, rolls over the rings and fills them, only to mostly spill out before getting around to the driving rollers. Large particles like pebbles would be wiped out by the brake shoes, which are just above the rollers, but the small sand goes through and is often crushed. Snow to the axles seems to have no appreciable effect on the drive. The query as to whether very fine mud would not act as a grease has been tested by a Texas doctor, who sent a package of road dirt from his section with the request that it be made into mud and applied to the rings. It was mixed and taken to the foot of a 13 per cent hill, which is about the limit of high-gear ability, where the rings were filled with it, one man walking behind applying more, while the other drove up on the high gear. The climb was made, if anything, easier than without the mud, and no increase of pressure to prevent slip was to be noticed. The mud was squeezed out of the grooves like ribbons from a tile machine. This undoubtedly took some power, but its action as a grit probably partly made this up. Mud is certainly not a lubricant between the surfaces of this drive. The reverse ring, being smaller, does not have the leverage that the forward ring has, and on the rig used in this particular test it was necessary to pull the lever back firmly against the seat to get

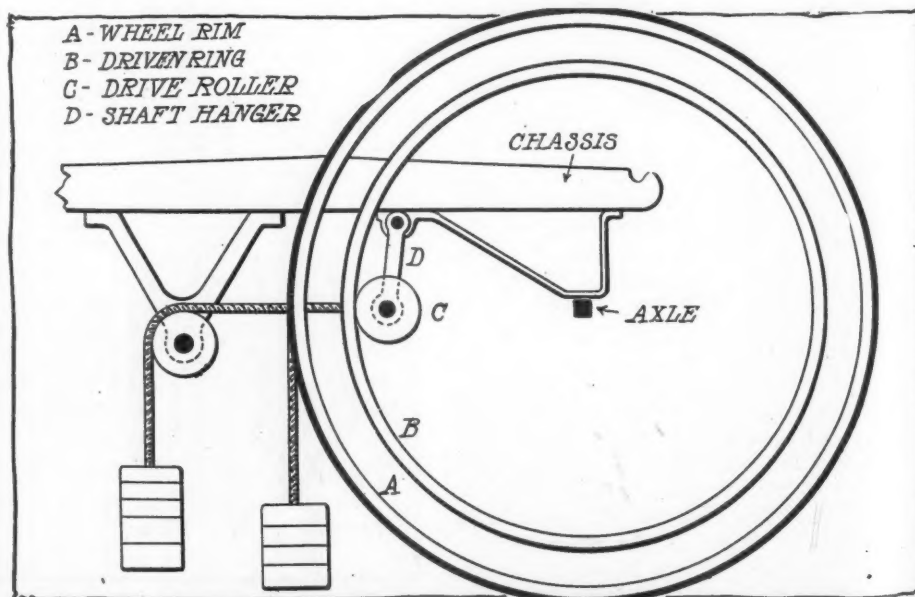


FIG. 2—TEST OF ROLLER DRIVE

pressure enough to reverse under hard conditions. During this mud test we could reverse up the 13 per cent hill, a feat which had not been done before and seldom, if ever, since. I do not know the limits to which this drive is applicable. As before stated, it can be made wider with no additional friction loss. The grooves can be made larger with some additional friction loss. We load a light delivery wagon—1,000 pounds weight—with its own weight of iron, and take a 9 per cent hill on the high gear. We tow a truck weighing 2,200 pounds up a 3 per cent to 4 per cent grade behind a buggyaut of less than 1,000 pounds weight including its driver on high gear. One rig towed another through snow to the axles; so deep that no other motor cars were on the streets and taxicabs had to be pulled in with four horses. This mostly on the high gear and without tire chains. Note that the weight at the rear is likely responsible for this latter result.

TEXAS WANTS CONVICT LABOR

Austin, Texas, Feb. 7—An effort will be made at the coming session of the legislature to have a law enacted providing for the construction of a state highway from a point on the Red river, the northern boundary, to one of the gulf ports. The proposed state road will be about 500 miles long. The bill covering the proposition has been prepared by Senator H. B. Terrell, of West county. He says he will introduce it soon after the session opens and that he will do his best to bring about its passage. Mr. Terrell also has prepared a bill providing for the creation of a state highway commission whose duty it shall be to look after the construction of roads in the state. It is his plan to have the proposed trans-state highway constructed by convict labor and that the services of the short term convicts be employed for the purpose. Whether the expense of constructing the roads shall be borne entirely by the state or apportioned among the counties through which they shall pass is a matter that the legislature shall determine. It is claimed by Mr. Terrell that by using the labor of convicts the additional expense for constructing the main highway north and south through the state will be comparatively light, and that the different counties through which it will pass would doubtless gladly pay their portion of the cost and thus enjoy the prosperity that goes with highways that have been improved.

The general use to which the motor car is being put in the every day business affairs of the people of the state, not only in the cities and towns but in the rural sections is creating an imperative necessity for better highways, it is stated. The proposed state road will be constructed with the special view of accommodating the motor traffic through the more populous portion of the state. The tentative plan as outlined by Mr. Terrell provides

that the route of the proposed highway shall be from a point on the Red river just above Denison, south through that town, Sherman, Dallas, Waxahachie, Hillsboro, Waco, Temple, Bastrop, Cuero, Goliad and Sinton, to Aransas Pass. This prospective route, however, may be changed to run further east so as to make Galveston the gulf terminal.

The sentiment for good roads is growing all over Texas. Many large bond issues for the purpose are proposed by the different counties during the present year. According to reports received by the attorney general's department which is vested with the authority of approving all such bond issues in this state more issues of road construction and improvement bonds are now pending than at any time in the history of the department. A recent calculation placed the aggregate of these proposed road bonds for the present year at about \$25,000,000. It is stated by the attorney general's department that this estimate is not excessive and that the cost can be kept within bound.

That the general use of motor cars is responsible for the present good roads movement in Texas cannot be doubted. The demand for better highways come from all classes of citizens—the residents of the cities and towns as well as those of the rural districts.

It is considered practically assured that

the legislature at its coming session will create a highway commission, as advocated by Mr. Terrell and that the basis for a splendid system of roads all over the state will be established.

UNCLE SAM'S CARS TAX FREE

Washington, D. C., Feb. 7—The White House has been paying licenses for the cars which the government has provided for the use of the president and his family, although not required by law to do so. In the District of Columbia, Maryland and Virginia, licenses have been procured for the executive's machines.

Because Charles D. Norton, secretary to the president, recently wrote to John E. George, Maryland's motor car commissioner, applying for licenses for Mr. Taft's motor cars, but failed to enclose a check to pay for the same, Mr. George replied that he would send the licenses as soon as he had the money.

The comptroller of the treasury recently decided that neither the District of Columbia nor the states could tax government cars. Further, the quartermaster general of the army, in a recent order, said: "By decisions of the United States supreme court is held to settled law that the property of the United States and the instrumentalities whereby it performs its proper governmental functions cannot be taxed."

Large American Export Trade in 1910

WASHINGTON, D. C., Feb. 4—The American export trade in motor cars and parts reached its highest point during the calendar year 1910, when 8,440 cars, valued at \$11,210,295, together with parts valued at \$1,980,001 were shipped to various foreign countries, making a grand total of \$13,190,296 for the year's export business. This is almost double the business of the calendar year 1909, when 4,686 cars, valued at \$6,889,931, and parts valued

at \$987,586, were exported, making a total of \$7,876,617 for the year. During December, 1909, the number of cars exported was 458, valued at \$503,431, together with parts valued at \$96,604, while in December last the number of cars exported increased to 757, valued at \$870,390, together with parts valued at \$175,505.

The comparative figures for December and the calendar year as announced here were as follows:

Exported to—	1909	1910	1909	1910
	—December—	—December—	Twelve Months Ending	Twelve Months Ending
United Kingdom	\$155,446	\$116,288	\$2,059,210	\$2,755,592
France	28,365	33,677	846,136	753,204
Germany	8,992	1,625	181,087	331,754
Italy	498	12,635	224,068	377,750
Other Europe	23,110	19,918	335,675	764,463
Canada	174,795	339,945	2,437,042	5,021,043
Mexico	44,001	52,323	494,238	689,908
West Indies and Bermuda	46,490	58,873	337,414	412,588
South America	28,787	73,567	240,453	519,160
British Oceania	56,415	200,536	303,452	748,983
Other Asia and Oceania	19,242	114,592	191,448	599,756
Other countries	13,894	21,976	136,394	216,150

Imports of motor cars continue to drop. The number received during 1910 was 1,024, valued at \$2,080,555, together with parts valued at \$656,653, while in 1909 the number of cars imported was 1,645, valued at \$3,071,002, while the value of the imported parts was \$856,506. During the month's period the imports of cars de-

creased from 149, valued at \$292,545, in 1909, to 83, valued at \$178,900 in December, 1910. During these same periods the imports of parts likewise decreased in value, from \$62,811 to \$25,830.

The comparative imports during the periods under consideration were as follows:

Imported from—	1909	1910	1909	1910
	—December—	—December—	Twelve Months Ending	Twelve Months Ending
United Kingdom	8	13,181	101	233,383
France	65	132,543	928	1,670,900
Germany	24	48,984	127	321,033
Italy	44	78,820	8	689,454
Other countries	8	19,017	71	156,232



SAMPSON LINE READY FOR THE ROAD—FROM 1,000 POUNDS UP TO 5 TONS

TRUCK TEST ON COAST

DECISION has been reached by the judges in the recent motor truck reliability run given by the Portland Journal at Portland, Ore. The prizes in the two divisions were carried away by the White 5-ton gasoline truck and the Franklin 1-ton delivery wagon. Competition in both classes was so close that the cup was only won by the fraction of a cent in both classes. Prizes were awarded to the truck carrying its load the required distance for the lowest cost per ton mile. The score of the White truck was 1.3 cents per ton mile, while that of the Franklin was 2.25 cents per ton mile. Fourteen competed, eleven finishing and four had perfect road scores. The survivors were the Gramm, Kelly, two Whites, two Packards, Buick, Sampson, Stoddard-Dayton, Schaet and Franklin.

READJUSTING MAIL SERVICE

After a rather unsatisfactory experience with motor postal vans, the authorities of Paris are now asking for contracts for the supply and maintenance of 141 motor cars for carrying mail from the suburbs to central offices, and from these latter to the various railroad depots. A few years ago the postal authorities of Paris decided to change from horse to motor service for the carrying of mail, but owing to the low price of the contract and the difficulties of the service, the contracting company quickly became bankrupt and the postal authorities had themselves to undertake the transportation.

Under the new system it is intended to place the carrying of all mail matter in the hands of a private company, having a monopoly for 12 years, with the stipulation that motor vehicles must be employed, with payment on a mileage basis. It is estimated that the 141 vans, which do not include reserve vehicles, will have

The Realm of the

to travel about 1,900,000 miles a year. Three types of vehicles are provided for, having a load capacity of respectively 1,760, 2,640 and 3,900 pounds. The new service will come into force about the end of the present year.

The municipal council of Paris has under consideration the withdrawal of the privilege granted to the postal vans of running without registration numbers and without rear lights. Under the police regulations no motor vehicle can be used without a registration number unless its maximum speed is less than 18 miles an hour. This is not the case of the mail vans. The privilege of dispensing with the rear light is not granted to any other type of vehicle. It is owing to the large number of accidents recorded against the mail vans that the city proposes to put them on the same level as other motor cars.

TRUCKS IN SPEED TESTS

Competitive tests between the Kissel and the Packard motor trucks were made at Sheboygan, Wis., to demonstrate to the agents and to a number of prospective buyers the qualities of the big cars. The Kissel won in a race over a 2½ mile course to demonstrate speed and power. Both trucks were loaded with 11 bags of cement, equivalent to 5 tons, and the Kissel made the distance over country roads in 10 minutes 30 seconds, a speed of 15

miles an hour. The Packard's record was 14 minutes 45 seconds, or 10.75 miles per hour. The Kissel negotiated a hill laid out in the course in 1 minute flat, and the Packard in 1:42. Without load the Kissel weighed 6,830 and the Packard 6,850.

PUT TO STRENUOUS TEST

One of the 3-5-ton White trucks made a remarkable run from Baltimore to Washington in the midst of a small sized blizzard in order to demonstrate to members of the National Association of Warehousemen, at their convention in Washington, just what one of these trucks could do during the most adverse weather conditions.

Besides the raging blizzard, the snow on the ground was 12 inches deep and the roads were extremely muddy, in some places almost impassable. To make the accomplishment more remarkable, the truck was loaded to its full capacity with furniture. The trip from the Monumental City to the Capital City was made in 5 hours 25 minutes, the actual distance covered being 42½ miles. The Diamond spliceless wire mesh base tires, with which the truck was equipped, were in perfect condition when the truck arrived in Washington.

The trip was made under the auspices of the Security Storage and Truck Co. of





PACKARD OF 3-TON CAPACITY ON MISQUALLY RIVER BRIDGE, TACOMA, CARRYING 7,000 POUNDS OF MEAT

Commercial Car

Baltimore. Between Laurel and Contee the truck was up to the hubs in mire and to complete an excellent performance, it was stopped twice to extricate two horse-drawn teams which had been stuck in the mire.

PLEASES THE FIRE CHIEFS

Fire Commissioner Charles D. Daly of Boston expects to have all the district chiefs of the department using motor wagons shortly, and it is known that the city will need six more machines as a result. Some of the local dealers are letting their cars have a tryout in this work now. Morton H. Luce of the Velie placed the Boston service car at the disposal of Chief Madison of Brighton for a week and the fire chief was delighted with the change from piking along behind a horse.

"There is no question but what the motor wagon will supplant the horse for this kind of work," the chief told Mr. Luce. "Motor cars are particularly well adapted to suburban districts where long distances are traveled."

TESTIMONIAL FOR FIRE-FIGHTER

E. D. Dodge, Boston representative of the Pope-Hartford, has received a letter from a fire chief who maintains a Pope-Hartford fire wagon, in which he says:

"One morning recently we got a call from an outlying district 4 miles away and with the wagon we were able to make the run in 15 minutes, saving the property. As to trouble—we have had none. Not once has this machine refused to go. When called on everything works fine and because we are making good the town officials and the citizens feel secure and that they are amply repaid for their expenditure. As to the cost of maintenance, it is so small that it is hard to make our people believe it. Last month with all of our practice runs it was \$5.64. This car, you understand, has done away with four horses, one hose wagon and one chemical engine, so that the cost of maintenance would not shoe the horses that this car takes the place of, not to mention the feed."

REASON HORSE SHOULD GO

A novel idea applicable to the growing popularity of motor wagons for commercial service is brought forward by Bernard Ginsburg, vice-president of the Grabowsky Power Wagon Co. of Detroit. Mr. Ginsburg points out that horses attract flies and are responsible for a large proportion of the spread of disease through these insects. When the horses are forced to give way to the motor wagon—as Mr. Ginsburg predicts will be the case within a very

few years—the result will be seen in the great improvement in health sure to follow.

Mr. Ginsburg believes that all cities should legislate against the use of horses on the streets and in its stables. While admitting that motor cars may at times give off unpleasant odors, he maintains that these odors are not in the least prejudicial to the health of a community.

MOTOR CAR LITERATURE

An attractive 1911 catalog is that describing the Case cars, issued by the J. I. Case Threshing Machine Co., Racine, Wis. It is a thirty-two-paged brochure with an embossed gray double cover, and printed in two colors. The marginal illustrations give it a most pleasing and artistic tone. The complete line of Case models are clearly set forth, augmented with several parts illustrations.

Owners and prospective buyers of Stevens-Duryea will find interesting reading in the booklet entitled "What is Your Ideal of a Motor Car," which is being mailed by the Stevens-Duryea Co. It discusses at length the three-point support—the company's slogan—and one of the many interesting illustrations is the chassis view, showing the straight-line drive from beginning to end. This forty-four-paged brochure, nicely printed on cream tinted, deckle-edged paper, profusely illustrated with pen-and-ink drawings, is arrayed in a bright red embossed cover.

The Automobile Log Book, published by the Log Publishing Co., San Francisco, Calif., is a cloth-covered, 4½ by 8½, thirty-six paged expense book for the year 1911. Motor car users desiring to keep an account of their car expense will find complete tabulations for gasoline, oil, tires and tire repairs, meter readings, road and meteorological conditions.





The Motorists' Bookman

It is not so very long ago that a traveler among the Alps had to trust to his own legs or call in the aid of a horse. The method was slow and fatiguing, but the best at command. Today the motor car has invaded the region, making Alpine climbing pure enjoyment and exhilaration. Those who long for the sport and delight of motor mountaineering, "The High-Roads of the Alps," a motoring guide to one hundred passes, a most practical and informative book. Mr. C. L. Freeston, the author, who has toured for 17 years in the Alps, is thoroughly conversant with his subject and though the scenic beauties of motor mountaineering are ever present throughout the book, he writes authoritatively on this phase of motoring.

In a chapter on the grouping of the passes, the author impresses upon the reader that the Alps are not confined to Switzerland alone—fortunate, because of the present embargo prevailing against motor vehicles in Switzerland—but that they extend over France, Italy, Germany, and the Tyrol, a distance of 630 miles. He emphatically destroys the erroneous ideas that have been prevalent as to the Alps not being negotiable with a motor car because of the supposed terrific gradients, narrow passes, avalanches, etc. Instead he clarifies the atmosphere; he convinces the reader that there is nothing to cause undue worry, if he has a good, sound car. He will have, nevertheless, experiences such as he has never had to cope with in ordinary touring, and his driving skill tested to a wonderful degree, but maintains that there is absolutely nothing to fear in motoring over the Alps at present.

Much practical advice on the equipment

THE FLYING MERCURY

"The Flying Mercury" is the story of an ambitious chap who lived to do something and was never undaunted by a failure or mishap. He becomes a racing driver for the manufacturers of the Mercury car under auspicious conditions, he having won many a race with an inferior machine pitted against the Mercury by his skillful handling and courage. There is a mystery connected with the young man's life which later is cleared up, proving him to be the discarded son of the senior member of the Mercury Automobile Co., whom he saves from bankruptcy by his inventive genius and skill. It is a love story served in the latest setting with all the thrills of a 24-hour beach race, in which the Mercury carries off the honors. The book, attractively illustrated in colors, is by Eleanor M. Ingram, and is published by The Bobbs-Merrill Co., Indianapolis.

Review of Current Literature Which is of Particular Interest to the Owners of Motor Cars and the Men Who Make Them

THE HIGH-ROADS OF THE ALPS

of a car for such touring is given—a most essential factor in ordinary touring and certainly a potent one for motor mountaineering. He lays particular stress on the matter of steering gears, advising the motorist who has not a good gear to stay at home, otherwise his pleasure will be marred by his having to stop and reverse on the hairpin turns, of which there are eighty on the Stelvio pass and sixty on the Pardo. With a good gear, the perfection of skill necessary in negotiating these hairpin turns only adds zest and enjoyment, and is one of the pleasures of pass-climbing in a motor car.

The matter of gradients, the author assures us, is not to be feared, a gradient of 8 per cent being rarely exceeded, and sudden changes in gradients a rarity, and as to road surfaces, to quote the author, "these are often surprisingly good, and the higher one goes the better they become. * * * The maintenance of the majority of the roads is not only good but vastly better than the tourist would ever have thought possible when he reflects upon the heights at which the road repairers have to work, and the extremes of weather which are experienced at such altitudes. * * *

As for avalanches and landslides, these are, of course, inseparable accompaniments to Alpine altitudes, but it is seldom that they interfere with freedom of locomotion during the summer months. The places where avalanches usually fall are well known, and provision is made accordingly. * * * In ninety-nine cases out of a hundred, moreover, the driver on an Alpine road can see with perfect clearness what he has before him, and can gauge at a glance what is necessary in the way of reduction of speed, the application of brake power, or the skillful rounding of a curve."

Mr. Freeston has included in his book a most complete itinerary of the various passes, giving in tabulated form the heights and distances in feet, and kilometers. "In ordinary touring," he says, "one regards an itinerary as complete which gives the names of the towns and villages en route, with all intermediate and progressive distances. Height, however, is the essential factor in the situation when tackling an Alpine pass, and instead of looking in the ordinary way at the distances to be covered, one must first consider the height which has to be climbed,

and then the number of kilometers in which the altitude has to be attained."

"To the driver of a motor car the journey over the Mount Cenis pass is one of sheer delight. * * * There is steepness enough to try the mettle of the car, and there are corners enough to provide the element of sport; but in neither case does the test become an ordeal. * * * When Napoleon built the Mount Cenis road, he made it as broad as possible with a view to the sweeping of an army with the utmost swiftness on to Italian soil; and the highway which once resounded with the tramp of armed men now provides the most glorious run for the motor car that could be found in any part of the world, if we compare like with like in respect of altitude."

But it is the Stelvio pass, rising to a height of 9,041 feet, which is the acme of motor mountaineering, says Mr. Freeston. Here it is that the supreme test has to be faced, here it is that nicety of skill in driving is brought into play, for in 25 kilometers is a rise from 2,940 to 9,041 feet, with forty-six of the eighty hairpin turns to be negotiated, with a gradient of 400 feet per mile for 15½ miles. There need be no fear, the author claims, in encountering any pitch to cause the motorist concern, and urges that if he will only keep himself and the engine cool no difficulty will be experienced in reaching the summit. Mr. Freeston does not hesitate to ridicule the laws barring the motor vehicles from the Swiss roads and in describing the Simplon pass he has appended a list of several absurd restrictions to which a motorist has to submit.

THE LANDS OF THE TAMED TURK

Because of the political conditions existing in the Balkan states today, Blair Jaekel's book entitled "The Lands of the Tamed Turk" will be found a timely volume, describing as it does the little-known countries of Servia, Bulgaria, Montenegro, Dalmatia and the recently acquired provinces of Bosnia and Herzegovina. The Balkan states have been called the "powder box of Europe" and according to the author Servia should be called the "percussion cap." Constant warfare has stunted the growth of these people, who are more and more coming to the attention of the motorist because of the wonderful scenery and historical features of this part of southeastern Europe. The book deals with the geographical, historical and commercial aspects of these states as well as with the customs, the institutions, the creeds and the politics of the people. L. C. Page & Co., Boston.

The illustrations, of which there are many, and which are reproductions from photographs taken by the author, aim to show the character of the mountain high roads. Americans touring abroad and longing for the sport of mountain pass-climbing in a motor car should not fail to read this most instructive and informative book. Kegan Paul, Trench, Truber & Co., London.

"Brazil and Her People"

"Last year the United States took 25,000 tons of crude rubber at a cost of \$64,000,000, and is still howling for more. The Amazon district dominates the rubber market of the world. Para and Manaus are the greatest rubber ports of that district. From these cities the rubber buyers make the expeditions into the very heart of the Amazon, and its many tributaries are nearly all the home of rubber gatherers. From these centers the Indian gatherers make their expeditions by canoe, and through almost trackless forests to the trees which they are tapping. These trees do not grow in clumps, but one will be found here, another there, and oftentimes these single trees are at a distance of several hundred yards from each other. The amount of crude rubber that a native can gather depends on how close the trees may be to each other. Upward of 100 rubber-bearing trees, the vines and shrubs have been classified, but the one known as the Hevea is the rubber tree par excellence of Brazil. It is indigenous to the Amazon and its tributaries. Rubber trees are oftentimes found which are as much as 12 feet in circumference, but such are exceptions. They require an abundance of moisture, and it is only in a thick forest where the moisture is constant and abundant that they will reach this extraordinary size. It is quite probable that thousands of these trees are still undiscovered, and perhaps large districts still await development; but it is equally certain that the rubber prospector has threaded his way through thousands of miles of Amazonian jungle in his search after this profitable article of commerce. At present unprecedented prices have bestirred the exporting firms to feverish activity. Sections of heretofore unpierced forests are now being threaded by the prospector, with his Indian guides busily engaged in cutting a path through the dense undergrowth and labyrinth of vines. The past year more than 75,000 tons of crude rubber with a value of \$300,000,000 were produced, of which 40,000 tons came from the Amazon river. This was wholly wild rubber, gathered almost entirely from a belt extending along the Amazon and its tributaries, and extending fewer than 3 miles into the interior. The vast forest beyond these borders remains untouched; but with the building of the railroad around the falls of the Madeira, which will be completed in 1911, and with the introduction of the gasoline boat, vast districts heretofore inaccessible will be brought within the reach of the rubber

gatherer; and while the gain in production each year has been approximately but 10 per cent over the previous year, there is no question but that this percentage will increase largely from this time forward."

This is a sample paragraph taken from Nevin O. Winter's book on "Brazil and Her People of Today." The book throughout its 380 pages is a most interesting work on present-day conditions in Brazil, an empire which in extent is larger than the United States of America with Alaska and the insular possessions left out. The book is a compilation of facts, such as the above extract from a section dealing with the rubber situation in the Amazon valley shows. To those engaged in the motor business the book is valuable, in that it gives a good account of the different industries in the empire and the possibilities of the motor in such. The book bears out the generally accepted fact that Brazil offers, perhaps, the greatest attractions for development of the present century. This has already been recognized by other industries in the country outside of the motor, it being a commonly known fact that large Chicago and Omaha packing houses have firmly established themselves in this great South American empire. To those only interested in the book because of the information it contains it will prove one of the most interesting descriptive works and narratives on this country. The chapter on the coffee industry and its magnitude is filled with information; as are the chapters on the American colony, the Amazon, the people and the different cities. L. C. Page & Co., Boston, are publishers.

Romantic California

In his "Romantic California" Ernest Peixotto, lover of the picturesque and classic, finds, in our own California—his native state, through which he toured by motor car—real bits of Italy and old Spain, over which there still lingers the old-world atmosphere and charm; "a romantic background revealed in unfrequented spots unknown to the general tourist." At Asti are to be found the real Italian vineyards with their vats of several thousand gallons; at Monterey and

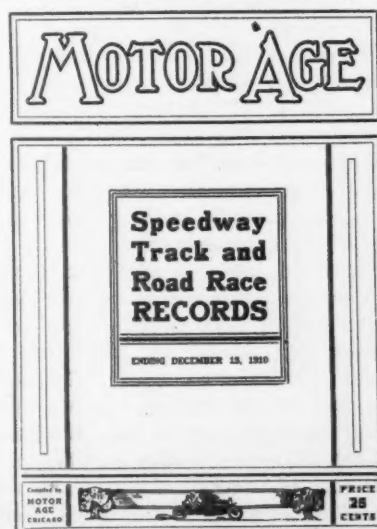
Santa Cruz the Spanish atmosphere still permeates the country. In the chapters "Journeys from San Francisco" are described the beauties and wonders of nature in the Golden State. The Piedmont hills, the author says, "are little known except to a few persistent lovers of nature and to some painters. You can motor among them from various points; from the beautiful Country club at Claremont, plunging at once from the golf links into quiet canons and country lanes; or you may climb their slopes from Berkeley, or from the broad boulevard—paradise for motor cars—that now skirts their bases almost to Hayward." The same charm of style pervades the present volume as "Through the French Provinces" and his books on Italian travel, and his own characteristic sketches add much to the romantic atmosphere of the book. The book is published by Charles Scribner's Sons, New York.

The Contest Review

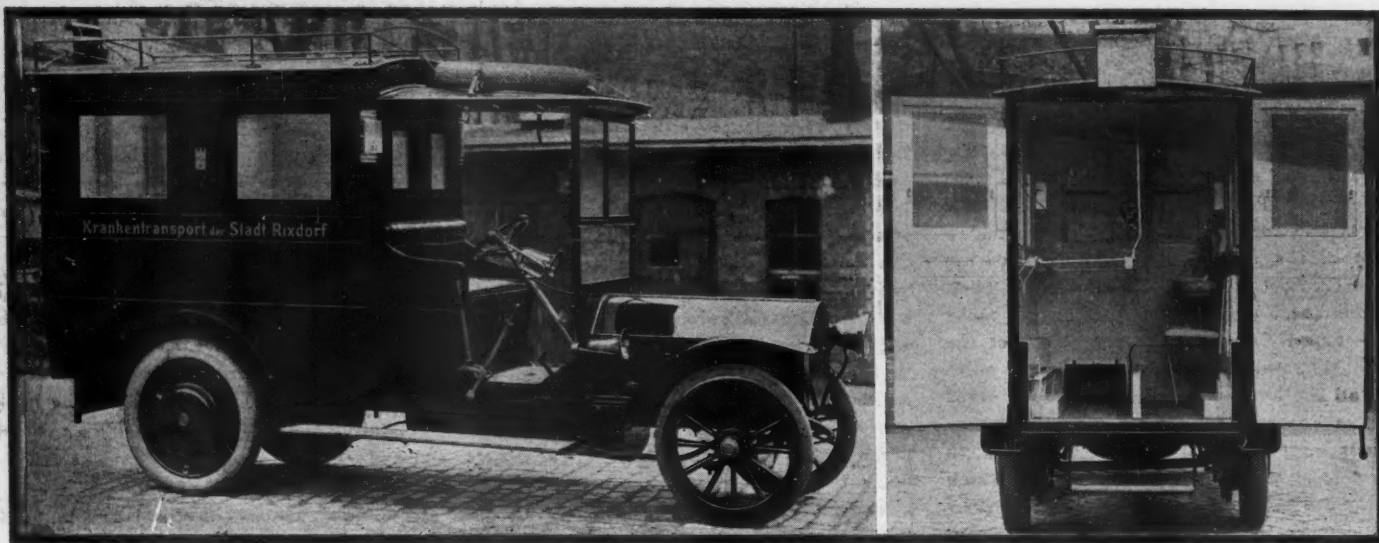
Following his custom of a year ago, C. G. Sinsabaugh, news editor of Motor Age, has reviewed the entire sporting events of the present, and these have been published in booklet form, as illustrated in an adjoining column. The booklet contains the performances of the great American road and track drivers as well as the big tour and reliability drivers of the country. In its pages are given the condensed contest reports of the seasons. Those who have followed the different cars in the big road races will find in this booklet a complete summary of their work, written in most interesting form. The winners in all the big contests of the season are arranged in concise form, and an additional feature is a table showing miles per hour made by every car that finished in a road race in America last year. The work of cars and drivers on the speedway also has been reviewed and tables are presented which give the number of starts and first, second and third places won by each car and pilot. The A. A. A.'s official records are published, while an addition feature is a historical resume of all the early road races which now have become discontinued. A chronology of 1910 is interesting. To the buyer looking for the work of the cars during the past season the book is a bonanza. It is published by Motor Age.

Boys' Motoring Experience

"The Automobile Boys of Lakeport," the fifth volume in the Lakeport series of books for boys, deals with a trip made by the lads through the mountains in a big touring car. There are experiences aplenty—an exciting race down a mountain road, the rescue of the car from a garage fire, the winning of a race and the stealing of the car by their rivals—all sufficiently thrilling to satisfy the most venturesome and daring youth. A mystery is interwoven which adds to the interest. The book is by a motorist, Edward Stratemyer, and from the press of Lothrop, Lee, Shepard Co., Boston.



From the Four Winds



EXTERIOR AND INTERIOR OF ELECTRIC AMBULANCE IN USE IN GERMANY

WILL Organize—Following in the footsteps of the Los Angeles and San Francisco tire dealers, Seattle tire dealers and those handling accessories have decided to organize as a protective association for the mutual benefit of all concerns engaged in that business.

Petition for Tunnel—The Automobile Dealers' Association of Pittsburg has renewed its petition to the county commissioners asking that the Shingiss street-Haberman avenue site will be selected for the proposed bridge across the Monongahela river and tunnel through the South Side hills. The petition is signed by about thirty of the leading firms in the city.

Making It an Industry—The agitation for highway improvement has resulted in the establishment of several factories in Wisconsin for the construction of road graders and other machinery designed to meet the popular demand for inexpensive but effective tools. The United States Simplicity Road Grader Co. has been established at Cumberland, Wis., to make a road grader invented by Frank Mattson. D. H. Cole is also interested.

Frowns on Scorching—In following out its policy to advance motoring in the state, the Automobile Club of Maryland has adopted a scheme for dealing with the scorches. This consists of furnishing the club members and others with little cards, with the proper spaces for reporting any case of speeding, recklessness in turning curves and other dangerous tactics that might endanger the lives of pedestrians by motor car drivers. In attempting to break up such violations the club has decided on the following action: On the first offense the owner of the car will be notified; on the second offense the matter will be turned over to the proper authori-

ties for prosecution, and on the third offense the proper authorities will make application to the motor vehicle commission to have the registration of the car canceled.

Sets Hill-Climb Dates—The Worcester Automobile Club will have its sixth annual Dead Horse hill-climb on either June 10 or 17 this year, the board of governors having asked the contest board of the American Automobile Association to reserve these dates and will choose one of them.

German Electric Ambulance—The community of Rixdorf, one of the most thriving suburbs of Berlin, recently ordered from the Daimler Motoren-Gesellschaft, of Berlin-Marienfelde, an electro-mobility ambulance designed on the Mercedes-electrique system. The chassis of this ambulance comprises two 10-horsepower electro-motors fitted into the naves of the rear wheels, the electric current being supplied by an accumulator battery comprising forty-two cells of a capacity of 195 ampere-hours. A distance of about 60 kilometers can be covered on good level roads with a single charge of the battery. The controller, placed within easy reach of the driver, comprises five forward speeds and a stoppage and three breaking positions, the circuit being interrupted by the passage from one step to the other. Arrangements for installing two folded-up stretchers for two patients are provided on one longitudinal side, the doctors or guards being accommodated on three folding seats on the opposite side. Furthermore, means are provided for hanging up a third stretcher. The ambulance comprises a complete washing stand. In addition to a speaking tube there is a speaking valve for communicating with the driver. Shutters fitted at the side windows allow the car to be ventilated. Boxes

containing the oxygen apparatus and surgical instruments respectively are located on the foot planks, while any tools required are installed below the driver's seat.

Savannah After the Vanderbilt—Although early in the game the Savannah Automobile Club is sending a representative to New York to make formal application for the Vanderbilt cup as a curtain-raiser for the grand prize race next fall. Harvey Granger has been appointed to see what prospect there is in getting the race.

Pittsburg is Proud—County Engineer S. D. Foster addressed the Automobile Club of Pittsburg last week and reviewed the road work done in Allegheny county last year and planned for this year. The county now has 450 miles of completed roadway. Of this total 57 miles was resurfaced last year and 50 miles reconstructed. More than 100 miles of roadway was oiled in 1910. This year plans have been perfected for resurfacing 60 miles of old roads and building 50 miles of new roads. Work will start about April 1.

Washington Election—The annual meeting of the Automobile Club of Washington resulted in the election of the following officers for the ensuing year: President, W. S. Duvall; vice-president, Leroy Mark; secretary-treasurer, W. Hamilton Smith; captain, T. S. Johnston; lieutenant, Franz Kopp; governors, Claude Miller, W. W. Chiswell, W. C. Long, J. M. Stoddard, Harrington Mills, F. B. Pyle, E. H. Johansen, W. D. West, John K. Heyl, M. T. Pollock. In his annual report President Duvall, who was unanimously reelected, advocated a hill-climb and an endurance contest to be given by the club early in the season, to be followed by another hill-climb in the fall. He also set forth that he has made a

careful study of the seat tax law which the district authorities are now trying to enforce, and is convinced it is unenforceable. As legal counsel for the club he will proceed to make a test case whenever the opportunity presents itself.

Puts It Up to Owner—Milwaukee legislators are responsible for the introduction of a bill in the Wisconsin legislature making it possible for persons injured or killed by motor cars to recover damages unless gross negligence on their part is proven. The bill would force the owner of the car to prove the negligence on the victim's part.

Motor Suits Pittsburg—The Pittsburg police department is substituting motor patrol wagons for horse delivery of prisoners in several of the prominent east end police districts. A half-dozen changes of this kind were made last week. The experiment has been uniformly satisfactory so far to Superintendent Thomas E. McQuaide.

Old Officers Re-elected—The annual meeting of the St. Petersburg Automobile Club of St. Petersburg, Fla., was held recently. The election of officers resulted in the same officers being re-elected: Dr. F. W. Wilcox, president; Ed. T. Lewis, vice-president; A. W. Fisher, secretary, and Horace Williams, treasurer. Dr. Harry Welch was elected to a vacancy in the board of governors, making the membership of that board Drs. Welch, Rouse, Hume, Turner and Brown.

Against Increasing Speed—At the last meeting of West Brandywine Grange, Patrons of Husbandry, which comprises the organization of farmers between Wilmington, Delaware, and the Pennsylvania state line to the north and west, proposed motor legislation, now pending before the general assembly of Delaware, was discussed, and it was decided to oppose the bill which increases the rural speed limit in the state from 20 to 24 miles an hour, the purpose of which is to conform to the Pennsylvania regulation in the matter. None of the other

motor bills has encountered any opposition so far. They impose penalties for placing tacks, glass or obstructions in the roads; exempt from license machines operated by municipalities, and make financial provision for building a macadam road the entire length of the state.

Worcester's New Home Opens—After being without permanent quarters since the disastrous fire of September 22 wiped out the old quarters in the top floor of the Chase building the members of the Worcester Automobile Club have taken possession of the finest suite of rooms in the city, located in the same building and on the same floor as were the old headquarters. Today the Worcester Automobile Club is the largest in New England. The club has nearly 500 members.

New One in Wisconsin—The Fort Atkinson Automobile Association of Fort Atkinson, Wis., is the latest organization to be started in Wisconsin and to seek membership in the Wisconsin State A. A. W. D. James has been elected president; H. H. Curtis, Dr. W. T. Clark, C. L. Brown, H. I. Claurer and C. E. Ward, vice-presidents; Joseph Specht, secretary, and C. A. Caswell, treasurer. The charter membership is twenty-five. President M. C. Moore and Secretary James T. Drought of the state association will initiate the new body into the state organization on February 10.

Entered at New Orleans—Entries for the mardi gras speed carnival which will be held in conjunction with the show at New Orleans February 25, 26 and 27, continue to pour in. Up to date fifteen drivers have entered the meet, while the assurance of ten more entries has been received. At the show twenty-five motor cars and fifteen accessory exhibits will be shown in the grand stand building of the track. Since the announcement of the entries of Caleb Bragg, in the Fiat Cyclone; Lewis Strang, Will Jones and Louis Larssonneur, in Case cars; Walter Donnelly in a Cino; Harry Endicott and part-

ner in two Coles; S. L. Speer and James Benzie in two Jacksons, entries have been received from the Corbin, Midland, Stearns and National.

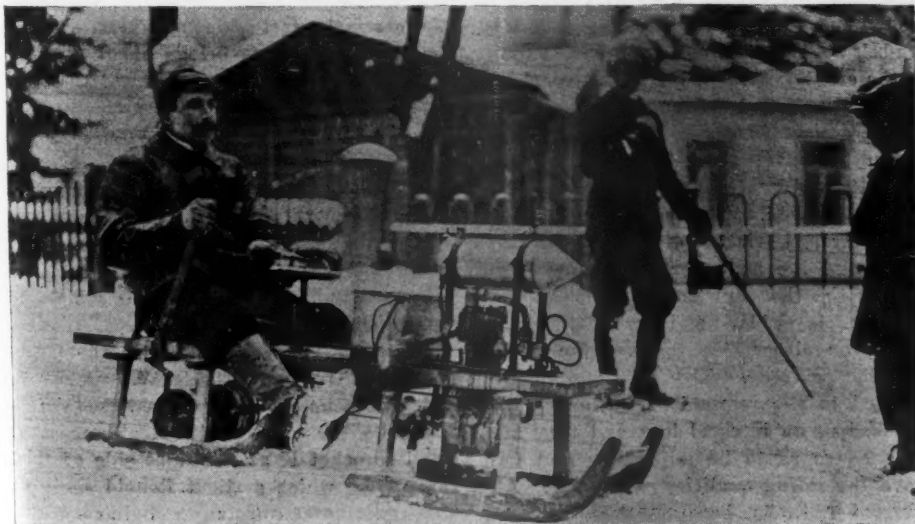
Midwinter Run in Electric—George A. Fort, representative of the Waverley Co. in Philadelphia, recently made a trip from the Quaker City to Manhattan in a Waverley electric. The distance covered was 112 miles and the elapsed time was 5½ hours. Mud 6 inches deep was encountered in many places. The car used was the new Waverley roadster, a stock car taken from Mr. Fort's show room and equipped with an A-6 Edison battery.

Michigan Still At It—Petitions for awards on 32 miles of good roads have been filed at Kalamazoo, Mich., by County Road Commissioner Bryant with the state good roads department, the work to be done during the ensuing year. This covers the improvements planned in the sixteen townships in Kalamazoo county and covers 28 miles of gravel roads, on which the state allows \$500 a mile, and 4 miles of stone roads, the allowance being \$1,000 a mile.

More Helpers—As the result of resolutions adopted by the Brotherhood of Wisconsin Threshermen in annual convention at Madison, Wis., a short time ago, a good roads promotion meeting will be held at Fond du Lac, Wis., on March 1 and 2 to carry out the plans for a state-wide movement in the interests of good highways. The brotherhood will act in concert with numerous other organizations in this propaganda, notably the Wisconsin State A. A. and the Citizens' Business League of Milwaukee.

Reliability for Texas—Preparations are being completed for the first reliability run which has ever been conducted in Texas under the sanction of the American Automobile Association. The run will start March 6. The pathfinder car will leave Houston within the next week to log the route of 600 miles which will be via Brenham, Giddings, Austin, San Antonio, Beeville, Goliad, Cuero, Victoria, Edna, El Campo and Richmond. The start and finish will take place in Houston. It is estimated that 4 days will be occupied in making the run.

Clubs Would Merge—At a recent dinner given by the Aero Club of St. Louis a resolution was introduced to consolidate the Aero Club with the St. Louis Automobile Club. President Sam D. Capen, of the St. Louis Automobile Club, in answer to the proposal declared strongly against the idea on the ground of the virtually unlimited assessments often made against the members of the Aero Club for the purpose of holding aeroplane and balloon exhibitions in St. Louis. Were these assessments apportioned among the members of the motor club, whose interests lie in an entirely different line, it would soon destroy the organization, he declared. The motor club will vote on the matter, however.



SNOW MOTOR RECENTLY INVENTED BY AN AUSTRIAN

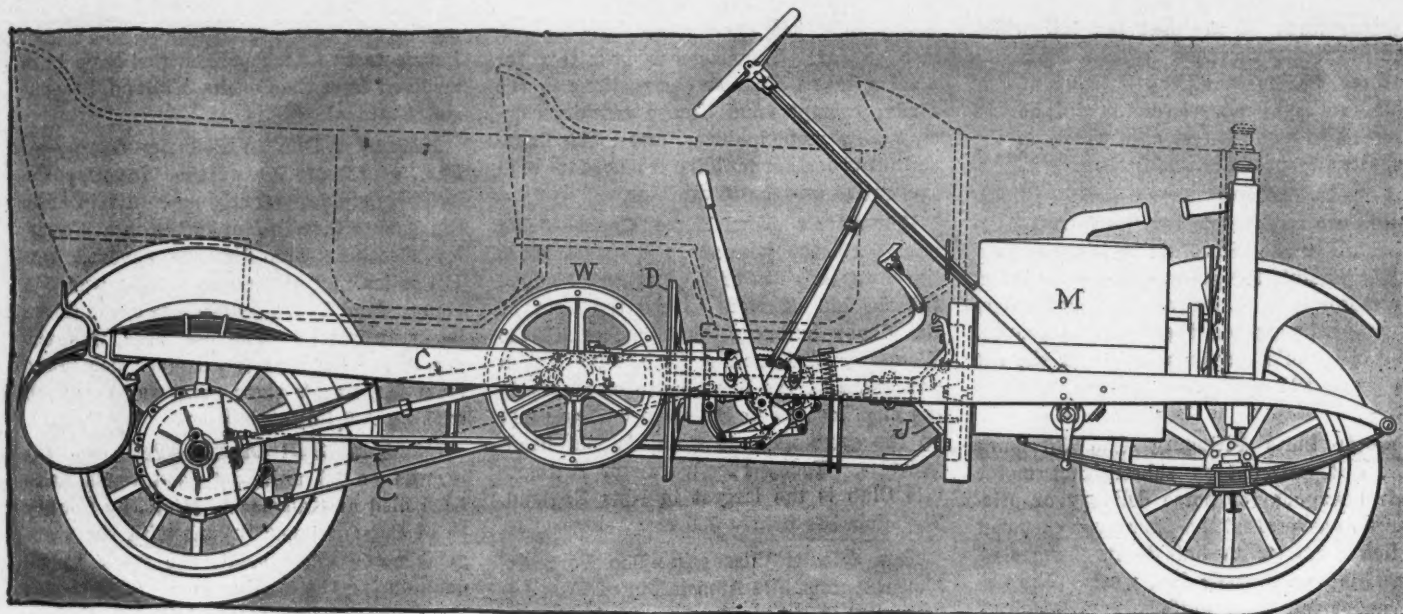


FIG. 1—SHOWING GENERAL ARRANGEMENT OF THE MANY INTERESTING LAMBERT DETAILS

CONSISTENTLY adherent to a basic design which has proved its merit from the very first, the Buckeye Mfg. Co., Anderson, Ind., announces the completion of details characteristic of the Lambert patented friction-drive cars in their tenth year before the public. The most important feature of these cars, the friction transmission, remains unchanged, except for one or two minor points which the developments of the 1910 season have made practicable.

The Lambert line for 1911 will comprise six models built upon four chassis types whose constructions are identical, except that the model 100 has a four-cylinder Rutenber motor and the other models four-cylinder en bloc motors with ball-bearing crankshafts; and there are a few differences in dimensions, as shown in an accompanying specification table:

**SPECIFICATIONS OF LAMBERT MODELS
FOR SEASON OF 1911**

Model	Body Style	Passen- gers	Bore	Stroke
101	Torpedo	4	4 1/8	4 1/2
100	Touring	5	4 1/8	5
88	Touring	5	4 1/8	4 1/2
77	Toy Tonneau	4	4 1/8	4 1/2
55	Surrey	4	4 1/8	4 1/2
44	Roadster	2	4 1/8	4 1/2

Model 100 is practically the same as model 47 of 1910, except that the frame is reinforced with truss-rods, an extra external-contracting emergency brake is to be found on the rear wheels, a folding trunk rack is fitted and the hood and radiator are larger and of a torpedo type.

On model 88 chassis, which is a development of the 1910 model 36, many small improvements in detail have been made. The main bearings in the motor are annular ball instead of plain babbit, giving a lighter, shorter and more compact construction in proportion to the increased horsepower; a float showing level of oil in the reservoir is located in a convenient place on the motor; the front motor support is now below instead of above the end of the crankcase; the chain water pump drive is replaced by enclosed gears;

The Lambert Friction-Driven Cars

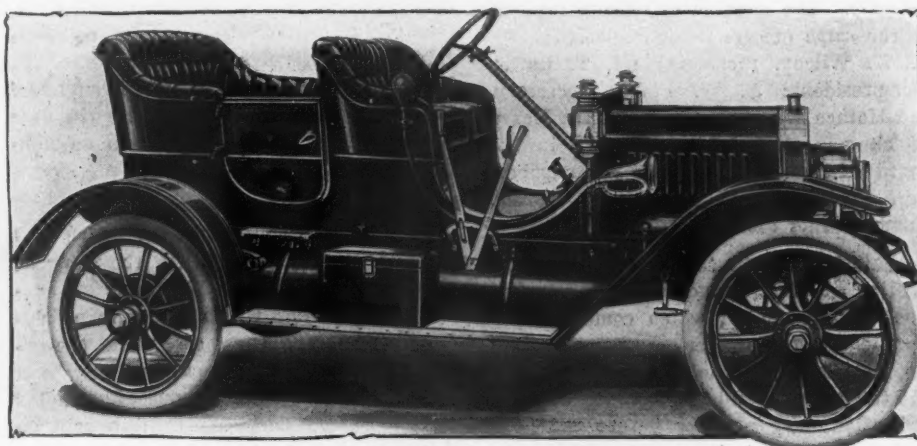


FIG. 2—LAMBERT MODEL 88 FRICTION-DRIVE CAR

a brass water pump replaces the aluminum one; the radiator is larger; the engine gears and fan-belt pulley arrangement is changed so that now the gear driving the water and oil pumps is directly opposite the present position of magneto gear, the fan-belt pulley is in front of the gearhousing on the crankshaft, and the magneto, which is of an improved type, with its coil under the hood in front of the dash, is driven by bevel gears and a transverse shaft that gives the magneto a very desirable location. The coupling between the motor and friction disk has been simplified and the male portion is now integral with the flywheel. The driving sprocket is wider and provided with flanges on either side to keep the chain properly centered. The radius rods are clamped to the rear-axle tube instead of attached to an integral lug; and they are designed so as to be adjustable and improve the riding qualities of the car. An external brake has been added to the rear-wheel drums, and a truss rod is provided.

The general arrangement of the charac-

teristic features of the smaller chassis is quite clearly shown in Figs. 1 and 3. The block motor M has a pivotal bearing on the cross member of the frame in the front and the two rear legs are bolted direct to the channel steel side members of the chassis frame. This brings about the desirable three-point suspension which eliminates the strains on the crankcase and crankshaft bearings that otherwise might be brought about by contortions of the frame when driving the car over uneven roads. From the motor the power is transmitted through a specially-designed universal joint J, and horizontal shaft T, to a large aluminum-faced disk D which is free to slide forward and back. This disk when brought into contact with the large fibre-tired friction wheel W, which is slidably mounted on a transverse shaft, transmits the power thereto. There is a small sprocket K at the right side of this shaft from which a silent Renold chain C transmits power to a larger similar sprocket mounted on the rear axle.

As for details, the motor whose four

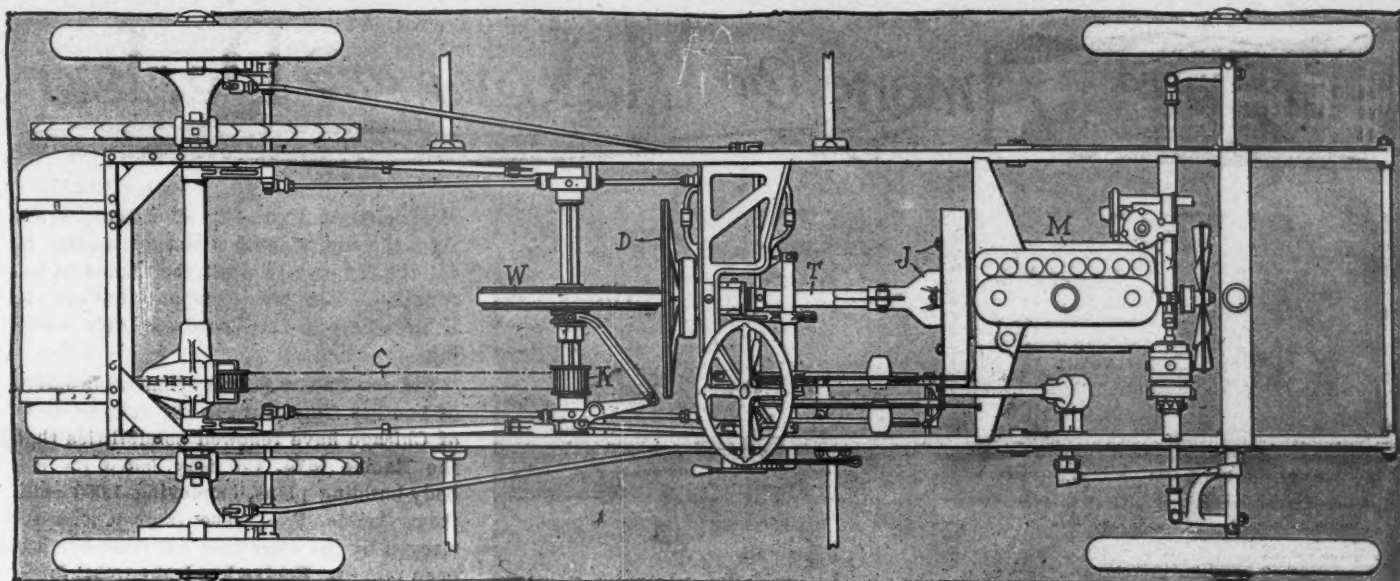


FIG. 3—PLAN VIEW OF LAMBERT CHASSIS WITH GENERAL ARRANGEMENT OF THE FEATURES AND CONTROL MECHANISMS

Manufactured in Six 1911 Models

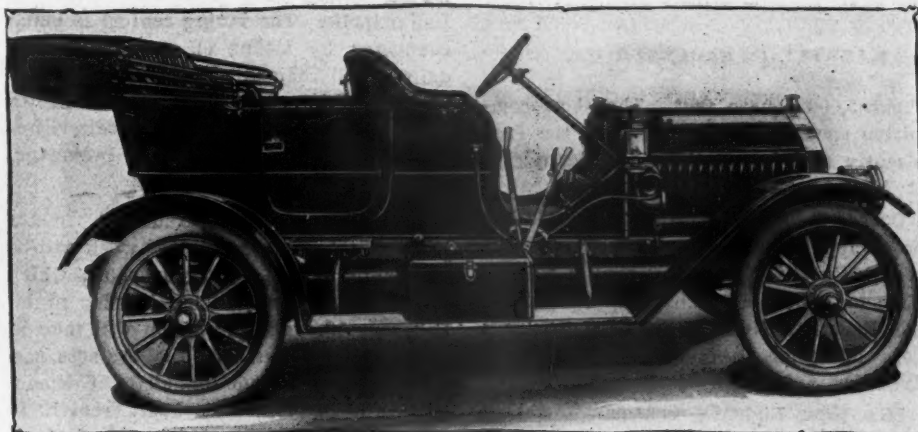


FIG. 4—LAMBERT MODEL 100, FRICTION-DRIVEN CAR

cylinders are cast in one piece, with integral water-jackets, is an L-type design with the valves all conveniently located on the left side. The valves are one-piece drop forgings with bevel seats, and the valve stems, pushrods and springs are inclosed by two steel plates, each held in place by a thumb-nut.

The removal of the lower portion of the case permits of easy inspection or adjustment of the connecting rod bearings or other internal mechanisms of the crankcase without in any way disturbing the two large annular ball bearings that support the crankshaft. The crankshaft is a heavy drop forging with all bearing surfaces ground to size. Connecting rods are drop forged from open hearth steel and provided with adjustable plain bearings at both ends. The single camshaft with cams is made from one piece of steel, which is case hardened, accurately ground and completely inclosed in the crankcase, where ample lubrication is provided. In the lubrication system of the motor the oil is drawn from the oil reservoir by a

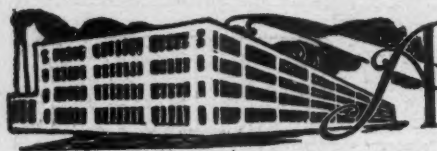
gear pump driven off the water pump shaft, and forced into the shallow splash basins and to the engine gearcase. The spray or splash created in the crank chamber by the revolving crankshaft provides adequate lubrication for the cylinder walls and all internal mechanisms; and an oil gauge of the float type is provided at the right forward corner of the crankcase to indicate, at all times, the amount of oil contained in the reservoir. A gear-driven centrifugal water pump, adjustable belt-driven fan, and vertical flat-tube radiator are features of the cooling system; and by the use of the en bloc cylinder casting the connections are short. Ignition is jump spark, dual type, with a low tension magneto and dry cells as sources of current.

The large friction disk is operated by foot, and the friction is applied by pressure on a pedal, which forces the extension disk rearward, bringing it in contact with the cross shaft friction wheel. When the pedal is released a spring is so connected that the contact is broken and the friction disk is thrown away from the cross shaft

friction wheel. The friction contact is made by a fork lever having a screw take-up or adjustment, which is very accessible. A $7\frac{3}{4}$ -inch thrust-bearing is provided just back of the friction disk. This bearing is comprised of three plates. The center plate, which is made of bronze, contains eighty-five $\frac{1}{2}$ -inch steel balls, and is sandwiched between two hardened steel plates. By the use of this thrust bearing, which is inclosed in a grease-tight case, all possible thrust strains on the extension shaft are eliminated. Speed-changing is obtained by shifting the large friction wheel sidewise on the cross shaft. The speed-changing device has been simplified and is operated by a short lever at the right of the driver's seat, which is connected to the friction wheel through a knuckle lever movement. The cross shaft upon which this wheel is mounted is supported on Hyatt roller bearings contained in universal roller bearing hangers attached to the side members of the frame; these are so designed as to permit the bearings to maintain their proper alignment regardless of distortions of the frame. The hangers are adjustable, and the cross shaft is removable from beneath the car by loosening two studs. The silent chain operating between the cross shaft and rear axle is thoroughly incased; radius rods are provided on either side which extend from the cross shaft hanger to the rear axle.

The frame is a comparatively rigid structure supported on semi-elliptic springs in front and elliptic rear springs. A tubular front axle is employed with plain bearing steering knuckles and adjustable ball bearings on the front wheel spindles.

The construction of the larger chassis is identically the same as that of the small car, except that the control levers inside of the body in the torpedo type, a Rutenber motor is used, the front axle is an I-beam design, the general construction is heavier throughout, the radiator is supported on a special cradle of pressed angle steel and a Wilkinson starter is fitted.



Among the Makers and Dealers



HAZARD & BROCKETT, HANDLING MAXWELL IN SAVANNAH, GA.

SPOKANE Dealer Dies—George Gallagher, of the Gallagher Machinery Co., Spokane, is dead, following an operation for appendicitis. Mr. Gallagher had just returned from a trip to the east, during which he secured the eastern Washington agency for the Cutting car.

Makes New Deals—The National Sales Corporation has entered into an arrangement whereby it will sell the entire output of Autobestine, manufactured by the Woven Steel Hose and Rubber Co., Trenton, N. J. It also has entered into an arrangement to sell the entire output of the Valve Seating Tool Co., Southport, Conn., manufacturer of portable valve grinding tools.

Deny the Rumors—Despite repeated rumors that Carl G. Fisher and James A. Allison, of the Prest-O-Lite Co., are interested in the recent purchase of the Remy Electric Co., at Anderson, Mr. Fisher and Mr. Allison say they are in no wise interested in the deal. The plant was purchased recently by interests represented by Stoughton A. Fletcher, an Indianapolis banker, and a new company is in process of organization.

Pittsburg Show Plans—The two Pittsburg shows are getting along nicely. The Exposition show has secured a number of attractions, including five aeroplane manufacturers. A recent meeting of the Exposition Automobile Show Society was held at the Hotel Schenley with thirty members present. The Duquesne garden show has secured the service of the Pittsburg symphony orchestra as a big musical feature. The entire seating area, including boxes and chairs, will be covered by a platform, thus increasing the floor space

about 5,000 square feet. The show committee spent nearly 2 weeks in the east recently studying display and color effects at New York and elsewhere.

Cooper Promoted—Harry W. Cooper has been appointed secretary and manager of the Excelsior General Supplies Co., of Chicago, which is a subsidiary concern of the Excelsior Needle Co., of Torrington Co., and which formerly was run as the Excelsior Automobile Supply Co.

Has New Lighting Scheme—A device for manufacturing electric current for electric motor-car headlights will be made by the newly organized Electric Lighting Co., of Indianapolis, which is capitalized at \$100,000. The device is the invention of J. K. Delano, Jr., an Indianapolis

electrician, and consists of a dynamo run from the engine, with a storage battery in reserve for service when the engine is not running. The new company has established offices in the Board of Trade building.

Bid for Racine Plants—Flattering offers of bonuses from cities in the neighborhood of Chicago have renewed possibilities that the Racine Mfg. Co. may move its big body-building plant, employing 1,000 men, from Racine, Wis. The factory was destroyed by fire December 12, 1909, but has been rebuilt. Racine has lost several large industries recently.

Brown Would Be King—Will H. Brown, vice-president of the Willys-Overland Co., is leading in the contest for the election of a king to lead the mardi gras motor car parade during show week next month in Indianapolis. The voting contest is being conducted by means of coupons printed daily by all Indianapolis newspapers. Another candidate, who is giving Mr. Brown a close race, is Charles A. Bookwalter, formerly mayor, and active in the Indianapolis Trade Association.

St. Louis Plans Parades—A motor parade every day of the show week will be a feature of the St. Louis show, which will begin at the Coliseum Monday night, February 13. The procession will take in the principal streets of the business section and will be made up chiefly of demonstrating cars. The noon hour, from 12 to 1 o'clock, will be devoted to this feature. The entertainment committee, which will have the parade in charge, has arranged so that stops will be made at the leading hotels on the return trip to the Coliseum, in order that out of town visitors may



INTERIOR VIEW OF UNITED MOTOR BUFFALO CO. AT BUFFALO, N. Y.

have an easy and luxurious method of reaching the exhibit each afternoon. They will be taken to the show in the cars. The work of decorating the Coliseum began Sunday. A floral background will be provided for each exhibition space by the show management.

Monitor Board Re-elected—At the annual meeting of the Monitor Automobile Works, at Janesville, Wis., the officers and board of directors were re-elected. William Westerlund is president. Since the beginning of the 1911 season the company has built or has now under construction fifty-five Monitor cars for commercial purposes, and the outlook is the brightest ever known.

Two Weeks at Cleveland—The Cleveland show, which opens February 18, will last 2 weeks. The first week of the show will be devoted to the display of pleasure cars. During the second week commercial vehicles will hold full sway. For the first time the local factories, Stearns, Peerless, White and Garford, will exhibit their full line of commercial vehicles. The Cleveland Motor Truck Mfg. Co. also will for the first time exhibit its new truck. Almost the entire space has been signed up for the commercial exhibit.

Rider-Lewis Sale Approved—The sale of the plant of the Rider-Lewis Motor Car Co., at Anderson, to interests represented by Lester C. Manson, a Milwaukee attorney, has been approved by the Madison circuit court. Manson represents a syndicate of Chicago and Milwaukee capitalists, who will take charge of the property as soon as its transfer from the receiver can be completed. The consideration is \$38,500, and it is said that creditors will receive about 12½ cents on the dollar. Under the terms of sale receivers' certificates to the amount of \$10,500 and a mechanics' lien of \$7,000 against the buildings will be paid. The balance of the consideration, after meeting court and receivers' expenses, amounting to about



NEW RETAIL BRANCH OF NATIONAL COMPANY IN INDIANAPOLIS

\$1,000, will be in cash. Temporarily operations in the plant have been suspended pending a settlement of the transfer. It is the intention to continue the operation of the plant at Anderson.

Plant in Demand—The Economy Motor Car Co., of Joliet, Ill., has not yet decided to which city the plant will be moved. Officials of the company have been negotiating at Beloit, Delavan, Janesville and other southern Wisconsin cities for several weeks. Thomas L. Tinchler is conducting the negotiations.

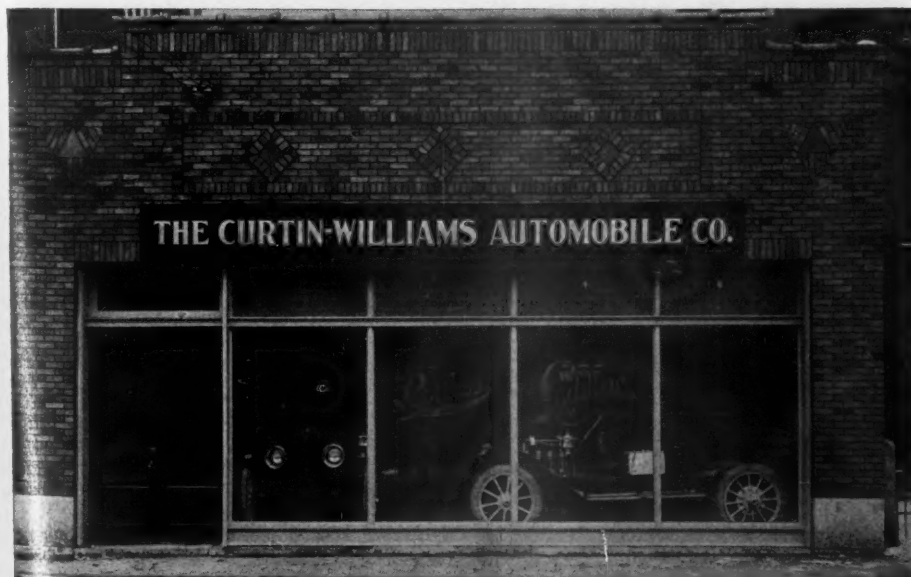
Big Building Opened—The new six-story tire building of the Goodyear Tire and Rubber Co., Akron, O., was dedicated Friday night with the largest ball ever held in that city, 3,000 persons being in attendance. The fifth floor was turned into a ballroom, and two orchestras furnished music. President F. A. Sieberling

and other officers of the company were prominent, but the ball was given by the Goodyear Beneficial Society. The event was in celebration of the tenth anniversary of the establishment of the company, which has had a marvelous growth in that time, now employing 3,300 persons.

Anderson Plant Sold—The plant of the Welch Electric Co., at Anderson, Ind., has been sold at receivers' sale to G. E. Rhodes, of Peru, representing F. R. Hoyt, of the Hoyt Electric Co., Indianapolis. The purchase price was not made public. The Welch company has held a number of patents for high and low-tension magnetos.

Seattle Dealers Act—The Seattle Automobile Trade Dealers' Association, of Seattle, Wash., held a meeting at which it was decided to hold a special event, the nature of which will be kept a secret until March 2. The new trustees elected by the association were as follows: Robert E. Manger, W. D. Wallace, Ira D. Lundy, E. J. Streslau, R. P. Rice, George Johnson and H. P. Grant. From these the officers elected were: Robert Manger, president; W. D. Wallace, vice-president; E. J. Streslau, secretary, and Ira D. Lundy, treasurer.

Will Make Spring Tire—The Security Spring Tire Co. has been incorporated at Wautoma, Wis., with a capital stock of \$50,000, to manufacture a new type of spring tire for motor cars invented and patented by B. F. Fry of Wautoma. The Security tire is composed of a series of elliptic springs covered by a felt cushion, and has an outer casing of belting, rubber or leather. It is puncture-proof and claimed to be more resilient than the pneumatic rubber tire. W. J. Durham, F. S. Durham, B. F. Fry, G. J. Bruce and H. A. Fry are promoting the new company whose plans are announced.



CURTIN-WILLIAMS AUTOMOBILE CO. STORE IN COLUMBUS, OHIO



Brief Business Announcements



ST. LOUIS, MO.—The Colonial Automobile Co. has moved into new quarters at 103 North Twelfth street.

Portsmouth, O.—The new garage of Ivan Hiley has been thrown open to the public. The plant consists of a sales agency, garage and repair shop.

Wilmington, Del.—Wilson M. Vinyard, of Milford, Del., has taken the state agency for the Buick car and will have his headquarters in Wilmington.

Allentown, Pa.—The Allentown Auto Works has been moved from Fifteenth and Gordon streets to 1411 Chew street, where it has much larger quarters. M. C. Ritter is the manager.

Philadelphia, Pa.—The Motorette Co. of Philadelphia has recently been incorporated, under the management of Henry H. Horrocks, and will at once begin alterations on new quarters at 234 North Broad street.

Boston, Mass.—The Lozier company has opened its own branch in Boston, having secured quarters in the new Autocar building on Beacon street in the back bay district. Charles Gormley has been appointed manager.

New York—The Atlas Garage Realty Co. has leased its building, 102-106 West One hundred and Seventh street for a term of years to Roy V. D. Lasher, who will operate it under the name of the Mason Garage Co.

Lancaster, O.—S. W. Athey, formerly with the Stoddard at Dayton, O., has secured a large interest in the Anderson Automobile Co. at Lancaster, and is re-opening the big repair shop of that concern on South Columbus street.

Wilmington, Del.—The Stoddard-Dayton Automobile Co., of Wilmington, has established itself in temporary quarters in a large building at Fifth and Orange streets. Until recently the building was occupied by the Wilmington Gas Co.

Washington, D. C.—The Swinehart Tire and Rubber Co. of Akron has just formed a Washington connection with the Terminal Taxicab Co., which has just completed and occupied a building the cost of which was in the neighborhood of \$100,000. In San Francisco the Swinehart people have closed with the Keaton Vulcanizing Works, 636 Van Ness avenue.

Hartford, Conn.—Fritz Offenhausser, for many years head of the motor department of the Maxwell-Briscoe Motor Co., and more recently vice-president of the Peninsula Gear Works, has joined the forces of the C. W. Kelsey Mfg. Co. as factory superintendent. Joseph I. Matthias, recently connected with the selling organization of the Overland Automobile Co. of

Philadelphia, has joined the sales force of the Kelsey company.

Hartford, Conn.—The Hartford Garage Co. has secured the local agency of the Marion car for this city.

Niles, O.—C. A. Decker of Warren, O., and C. B. Decker of Niles have opened up a garage in the Bentley building in this city.

St. Louis, Mo.—The Pope-Hartford Motor Car Co. will open a rental department in the near future. Light delivery also will be made a feature.

St. Louis, Mo.—H. M. Paine has been made secretary and manager of the Haynes Automobile Co. and the Cole Motor Car Co., with the Cole and Page-Detroit taken over.

Philadelphia, Pa.—The Krouse Motor Co. has removed from 331 North Broad street to the northwest corner of Broad and Cherry streets, where larger and more desirable quarters have been secured.

Franklin, Pa.—John A. and William Mc. Wilson and Gregg J. Spohrer have organized the Wilson Motor Starter Co., to manufacture automatic air-compressors and pneumatic starters for internal combustion engines.

Lancaster, Pa.—John H. Littrell, secretary of the Lancaster Commercial Club of Lancaster, has organized a company with large capital to manufacture a gasoline engine patented by W. Lee Crouch of Cleveland, O.

Milwaukee, Wis.—The General Welding and Mfg. Co. has been incorporated in Milwaukee by Paul Pleiss, George H. Gabel and M. C. Carmody. The capital stock is \$10,000. The company intends to specialize in motor car repair work.

Boston, Mass.—The Standard Tire and Rubber Co. has moved into its new home built for it on Portland street, where it occupies the entire five stories. The company now plans to branch out and start a store in New York in the near future.

Toledo, O.—At the annual meeting of the A. A. Atwood Automobile Co. of Toledo the following officers were elected: President, R. E. Hamlin; vice-president and general manager, A. A. Atwood; treasurer, Dr. Park L. Myers; secretary, H. P. Baker. The old directors were re-elected. A 10 per cent annual dividend, payable quarterly, was declared.

Milwaukee, Wis.—The Kopmeier Motor Car Co., 378-388 Summit avenue, agent for the Chalmers and Detroit electric, has decided to build a \$20,000 addition to its garage. The company makes a specialty of charging electric vehicles and has a capacity of 100 cars. This charging equipment will be doubled when the addition is

completed. The combined buildings will cover nearly a city block.

St. Louis, Mo.—The Kisselkar agency is now occupying its new garage at Grand avenue and Rutger street.

Columbus, O.—The salesrooms and garage of the Oscar Lear Motor Co. have been opened at 288 to 292 East Long street.

Baltimore, Md.—The Lozier Sales Co. of Baltimore has established temporary headquarters in the Academy of Music building on North Howard street.

New York—The Emil Grossman Co. has removed from 232 West Fifty-eighth street to 248-250 West Fifty-fourth street, New York. It will occupy one-half of the fourth loft, 62 by 85 feet.

St. Louis, Mo.—The Pope-Hartford Motor Car Co. has increased its capital stock from \$50,000 to \$150,000, fully paid. The assets are given at \$125,320.99. The liabilities are \$100,357.99.

Pontiac, Mich.—Three employees of the Oakland Motor Co. were promoted recently. Ernest F. Oberlin was made purchasing agent; Byron Winborn, assistant purchasing agent; and Dare Perry, production manager.

Indianapolis, Ind.—The Conduitt Automobile Co., which has had the Knox agency several seasons, has just added the Peerless to its line, while the Gibson Auto Co. has taken on the Franklin in addition to its other agencies.

Richmond, Va.—C. W. Forbes of Culpeper, Va., has been appointed state agent for the Marathon cars in Virginia. Mr. Forbes, who will operate from Richmond, is now closing with sub-agencies for Marathon cars in his territory.

Wadsworth, O.—The Wadsworth Motor Co. has been incorporated with a capital of \$10,000, to operate a sales agency, garage and repair shop. The incorporators are Bertha Simcox, Oscar Simcox, Bertha M. Miller, M. F. Miller and Carl Niswonder.

Columbus, O.—The United Motor Columbus Co. has closed a lease for a new sales agency and garage to be located on Fourth street near Chestnut street. The building is now being constructed and will consist of a salesroom 100 by 50 feet and a garage and repair shop 120 by 60 feet.

Pittsburg, Pa.—A. J. Becker & Co., capital \$5,000, is a new concern formed at Pittsburg by John T. Duff, Jr., F. S. Delp of Pittsburg and A. J. Becker of Ben Avon, Pa. Another new Greater Pittsburg concern is the East Liberty Automobile Co., capital \$5,000, which has been formed by J. J. Feich of Pittsburg, J. J. Gold-

smith of Carnegie, Pa., and F. R. S. Kaplan of McKeesport, Pa.

St. Louis, Mo.—The Firestone Tire and Rubber Co. has taken new quarters at Ninth and Olive streets.

Waupaca, Wis.—Thomas Salverson has been appointed agent for the E-M-F and Flanders in Waupaca, Portage and Waukesha.

Dallas, Tex.—Julian Dozier, of Taylor, Texas, has bought out the Hutto garage from John Sims, of that place, and will soon take charge of the same.

Kalamazoo, Mich.—A display room 40 feet by 80 feet in extent, one story high, will be erected immediately for the use of David Reid at 434-436 West Main street.

Conneaut, O.—The Conneaut Automobile Shop Co., capital \$10,000 has been formed at Conneaut by V. E. and P. H. Best, M. G. Spaulding, Charles H. Sessions and J. H. Wilson.

Philadelphia, Pa.—A new branch establishment, modern in every particular, has been opened at 249-251 North Broad street by the Roman Automobile Co. G. T. Derickson is the Philadelphia manager.

Hartford, Conn.—E. F. Dustin, formerly advertising manager of the Columbia Motor Car Co., has joined the organization of the C. W. Kelsey Mfg. Co. of Hartford, Conn., as advertising and publicity director.

New York—The Motorette Co. of New York has filed papers of incorporation, and will shortly open show rooms at 1989 Broadway, as New York agents for the Motorette. The new company will be in charge of C. H. Adler.

Upper Sandusky, O.—The Indian Motor Car Co. has been incorporated with a capital of \$10,000, to manufacture and sell motor cars, motor trucks and accessories, by S. W. Martin, M. M. Stoneburner, William Olpp, Estella M. Olpp and Thomas O'Brien.

Pittsburg, Pa.—The General Automobile Co., capital \$10,000, has filed its application for a Pennsylvania charter and will have its headquarters at 5518-20 Walnut street in the garage now occupied by the Mutual Motor Garage Co. The General has secured the agency for the Pullman and the Rainier.

Boston, Mass.—R. R. Ross, manager of the New England branch of the Fiat company has moved into the new salesrooms built for the company at 839-841 Boylston street. He has more than twice as much floor space as formerly and a large basement of equal dimensions for garage and repair work.

New York—Joseph Lowe, formerly head salesman, and S. S. Waldman, formerly purchasing agent of the Motor Car Equipment Co., will join the Emil Grossman Co., the former as vice-president of the company and the latter as purchasing agent. Mr. Lowe will cover the territory west of Chicago in the interests of both the Emil

Grossman Co. and the National Sales Corporation.

St. Louis, Mo.—The Lane-Lynch Motor Car Co., 1517 Locust street, has become the agent for the Marmon car.

Boston, Mass.—R. H. Blood, former manager of the Fish tire branch in Minneapolis, has come to Boston as manager of the Ajax branch.

Parkersburg, Va.—Sherman Dils and Henry Logan have organized a company to handle the Chalmers, Hudson, Buick, Franklin, Brush and Baker electric.

Pittsburg, Pa.—The Economy Motor Car Co. has been organized by O. S. Overland and Frank Drake of Pittsburg. It will occupy a fireproof garage on Collins avenue formerly used by the Fisher Automobile Co.

Gonzales, Tex.—The garage on North avenue, owned by Lauraine & Meisenhelder, has been purchased by a company consisting of Charles Neubauer, Frank Vrazel, Paul Templin, Emil Schleyer and Fred Meisenhelder.

Boston, Mass.—B. B. Perkins, who has been in the motor business in St. Albans for some years, has gone to Bangor, Me., where he has taken charge as manager of the Bangor Motor Co., agent there for Pierce-Arrow and Cadillac cars.

Los Angeles, Cal.—A. N. Davidson will erect a large garage on Wall street between Sixth and Seventh streets. It will be 120 by 160, one story brick with pressed brick front, plate glass windows, steel beams, cast iron columns, steel or frame roof trusses.

Nashville, Tenn.—H. J. Connick, formerly assistant manager of the Buick Motor Co., at Kansas City, has been appointed sales manager of the Southern Motor Works, Nashville, Tenn., maker of the Marathon car. L. M. Nims, recently assistant advertising manager of the Willys-

Overland Co., at Toledo, Ohio, is the new advertising manager of this concern.

Augusta, Me.—The Buick Auto Supply and Garage Co. has changed its name to the National Garage System, Ltd.

Baltimore, Md.—The Auto Outing Co. of Baltimore has taken on the agency for the Rapid motor truck in this and the Washington territory.

Chicago—Frank Wing has resigned his connection with the Randolph Motor Co. and now is identified with the Kelly Motor Truck Co. in the territory west of Chicago.

Carlisle, Pa.—W. W. Linn McCall is having plans prepared for one of the largest garages in this section. It will be fireproof and the front will be entirely of glass.

Philadelphia, Pa.—The Continental Motor Car Co., 510 North Broad street, has taken the Philadelphia agency for the Moon, with H. L. McCollough as the branch manager.

Racine, Wis.—The Universal Mfg. Co. recently incorporated, has leased a large building until it can erect a factory of its own. The company will manufacture steering gears, universal joints and other parts.

Laporte, Ind.—Henry Brothers have decided to establish a garage. A new building has been erected on Chicago street, two stories high and with a ground plan of 40 by 80 feet, the first floor is provided with a cement floor and equipped with the latest devices. They have the Rambler, White, and Hupmobile.

Indianapolis, Ind.—The Meridian Auto Co has just succeeded the Holcomb Motor Car Co., 724-730 North Meridian street, and will continue to handle the Packard and Waverley. Sixteen prominent business men of the city are incorporators of the new concern and H. J. Schwartz has been selected as manager.

Cincinnati, O.—The Ohio Motor Car Co. reports the sale of fifty Ohio cars to the newly organized Ohio Sales Co. of Georgia, located at Ocilla, Ga. The controlling heads of the Ohio Sales Co. of Georgia are J. C. Luke and J. W. Paulk. They will succeed the Georgia Automobile Co. as representatives of the Ohio.

Milwaukee, Wis.—The Imperial Safety Can Co. has been organized in Milwaukee to manufacture an explosion-proof container for gasoline, naphtha and other explosive substances, which is the invention of N. A. Christensen, of Milwaukee, inventor of the Christensen air-brake and president of the Christensen Engineering Co.

Boston, Mass.—W. A. Stiles, who has been associated with the Atwater Kent Mfg. Works of Philadelphia for several years, has severed his connection with that concern to become a partner in the F. R. Parker Co. of Boston, agent for the Elmore car, Atwater Kent products, Miller tires, Pan-O-Lite oils and greases and the Apple lighting system.

Recent Incorporations

New York—American Rim Co., capital stock \$100,000; to manufacture motor car wheels, rims, etc.; incorporators, A. H. Loew, H. F. Cook and G. H. Lambert.

New York—Hampshire Arms Garage Co., capital stock \$10,000; to maintain a garage and deal in motor car supplies; incorporators, Andrew Schmitt, Jr., Joseph Schmitt and William H. Manz.

Goshen, N. Y.—Automobile Owners' Mfg. Co., capital stock \$1,000,000; to manufacture and deal in motor cars; incorporators, W. Phillipson, F. H. Vehrenkamp and G. F. Munds, Jr.

Jersey City, N. J.—Montgomery Garage Co., capital stock \$125,000; to manufacture motor cars, aeroplanes, motorcycles, etc.; incorporators, C. N. King, Jr., M. A. Cox and G. H. Russel.

Jersey City, N. J.—Arcade Garage and Machine Co., capital stock \$10,000; to conduct garage; incorporators, H. H. Samuel, Otto E. Wolf and L. W. Samuel.

Jersey City, N. J.—Millburn Motor Car Co., capital stock \$50,000; to manufacture motor cars; incorporators, Julius Wittkop, Charles Wittkop and Henry Wittkop.

Philadelphia, Pa.—Everitt-Metzger Flander Co., capital stock \$50,000.

Philadelphia, Pa.—Keeler Motor Car Co., capital stock \$50,000.



Legal Lights and Side Lights

NEBRASKA ON RIGHT TRACK

THAT the Nebraska legislature is making a systematic effort to secure a comprehensive system of good road laws, was shown last week when the house and senate both adopted a resolution authorizing the appointment of a special committee to draft a set of laws covering the subject.

The resolution provides for a joint committee of three from each house to prepare a bill. There was a little objection in the house to the method of procedure, but there is such a general demand for good road legislation, and this seemed to be the most feasible plan, so that it carried by a big majority.

The legislative committee of the Nebraska Good Roads Association appointed at the recent convention is at Lincoln, and will work in conjunction with this special committee of the legislature.

The legislative committee will take all of the bills that have been introduced and try to frame from them a comprehensive road act.

Under the plan of the good roads association, the state board of irrigation would appoint a state engineer. He would have under him a deputy in direct charge of road and bridge work, a deputy in charge of state irrigation, and a deputy in charge of state drainage projects. In addition they would have the advisory assistance of a state highway board to be composed of the professor of rural engineering, and the director of soil survey of the agricultural college, and the state geologist, this commission serving without pay. In addition there is a plan for county roads organization. Supplementary to this general organization scheme there are proposed laws to provide for dragging the roads and other detail work.

TEXAS' LATEST SCHEME

One of the provisions of the bill that is now pending in the Texas legislature to create a state highway commission and the construction of a system of trunk line highways throughout the state imposes a road tax of \$5 annually on each motor car in Texas. It is estimated that this proposed tax would create an annual fund of \$75,000 to \$100,000, which would go a great ways toward keeping the roads in good condition. The bill also carries an annual appropriation of \$250,000 for road building.

Senator H. B. Terrell is the author of the measure. He has received assurances of support from a sufficient number of senators and representatives to insure its passage, he says. The proposed highway

commission shall consist of a professor of civil engineering from each of the two leading universities or colleges of the state, and one civilian member to be appointed by the governor. A commission thus constituted would have a majority of its members selected because of their training and engineering ability and without reference to their political affiliations, which would result in a non-partisan and technically competent commission; while the civilian member to be appointed by the governor would bring to the commission the business ability and experience essential to the proper and economic organization and prosecution of its work. At the same time, so long as the governor could only appoint the minority part of the commission, and the same being nonpaid, there would be no inducement at any time to make the position one of political preferment and so there would be no trouble.

The bill confers upon the different counties the authority to take the initiative in securing state aid for the construction of roads. As a safeguard to the state in reference to the payment by the counties of their proportion of the cost of such improvement, it is provided that all contracts of improvement shall be made in the name of the state, and that no such contract shall be entered into until the

counties shall agree in writing to assume their portion of the cost thereof.

In order that the state highway engineer may not be hampered in the prosecution of the work of the department by a lack of road machinery, tools and implements, it is thought best to vest him with authority, subject to the approval of the state highway commission, to purchase such necessary machinery and tools for the state.

AIMED AT BOY DRIVERS

Following a spirited debate in the Ohio senate, the bill introduced by Senator Cetone to make it unlawful for any person under 17 years of age to operate a motor car was passed. The bill provides for a fine of \$25 to \$50. It is believed the house of representatives will ratify the bill when it reaches it.

AMENDING OHIO LAW

An amendment to the Ohio law was introduced in the general assembly recently by Representative Rehne, of Williams county, providing that when an owner of a licensed motor car sells the car and buys another machine, he may file a description of the new car within 30 days and by the payment of a fee of \$1 secure his old plates and registration. Fred H. Caley, former Ohio registrar, suggested the amendment, which will likely be enacted into law.

The Show Circuit

February 6-11—Show at Buffalo, N. Y.

February 6-11—Show at Buffalo, February 6-11—Second week of national show in Coliseum, Chicago.

February 9-12—Show at Davenport, Ia.

February 13-18—Show at Winnipeg, Canada.

February 13-18—Show of Kansas City Motor Car Trade Association.

February 13-18—Show at St. Louis, Mo.

February 13-18—Show in Convention hall, Washington, D. C.

February 15-18—Show at Grand Rapids, Mich.

February 14-19—Show at Dayton, O.

February 18-25—Pleasure car show at Cleveland, O.

February 18-25—Show at Minneapolis, Minn.

February 18-25—Show at Binghamton, N. Y.

February 18-25—Show at Brooklyn, N. Y.

February 18-25—Show at Newark, N. J.

February 20-21—Show at Portland, Me.

February 20-22—Show at Bloomington, Ill.

February 27-March 4—Commercial car show at Cleveland, O.

For This Winter

February 20-25—Show of Hartford Automobile Dealers' Association, Hartford, Conn.

February 20-25—Show at Omaha, Neb.

February 20-25—Show at Cincinnati, O.

February 20-25—Show at Baltimore, Md.

February 24-27—Show at New Orleans, La.

February 25-March 4—Show at Toronto, Canada.

February 27-March 4—Show of Kansas City Automobile Dealers' Association, Kansas City, Mo.

February 27-March 4—Show week at Indianapolis, Ind.

February 27-March 4—Show at Sioux City, Iowa.

March 4-11—Show at Boston, Mass.

March 4-11—Show at San Francisco, Cal.

March 6-11—Show at Des Moines, Ia.

March 7-11—Show at Des Moines, Ia.

March 13-18—Show at Cedar Rapids, Ia.

March 14-18—Show at Syracuse, N. Y.

March 14-18—Show in Auditorium, Denver, Colo.

March 18-25—Show in Pittsburg, Pa.

April 5-8—Show at Sioux Falls, S. D.